ST. MARY'S UNIVERSITY

SCHOOL OF POST GRADUATE STUDIES

AN ASSESSMENT ON THE IMPACT OF VIRTUAL INTERNET SERVICE PROVIDERS IN THE FIELD OF INTERNET SERVICE DELIVERY IN ADDIS ABABA

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Board of Examiners Approval Sheet

This is to certify that the thesis entitled; An assessment on the impact of virtual Internet Service Providers in the field of internet service delivery in Addis Ababa; is prepared by Teyib Degu in partial fulfillment of the requirements for the award of the degree of Master of Arts in Project Management, with the regulation of the university and the accepted standards with respect to originality.

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DECLARATION

I, Teyib Degu, declare that the research paper entitled "An assessment on the impact of virtual Internet Service Providers in the field of internet service delivery in Addis Ababa" is my own and I have the courage to say, it is original research work that has not been produced by others in any other institutions or universities for any other requirements in any form. To this end, I acknowledge all sources of information that I used to produce the study appropriately.

Teyib Degu	_____	_____
Student researcher	Signature	Date

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List of Acronyms

DSL	Digital Subscriber Line
FBBI	Fixed Broadband Internet
GTP II	Second Growth and Transformation Plan
ICT	Information and Communication Technology
ICU	International Communication Union
IDI	ICT Development Index
ISPs	Internet Service Providers
LMT	Labor, Material and Transport
SDGs	Sustainable Development Goals
SLA	Service Level Agreement
vISPs	virtual Internet Service Providers
VPN	Virtual Private Network
Wi-Fi	Wireless Fidelity

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Abstract

The aim of this study was to assess in the impact of virtual Internet Service Providers in the field of internet service delivery in Addis Ababa, identify challenge areas and desires of vISPs and provide recommendation for the betterment of the business model. The objective of the study is to identify on the changes achieved with the intervention of vISPs in the field of internet service delivery and maintenance, nature of competition by vISPs, customer base expansion trend of vISPs, revenue contribution of the field for ethio telecom and the challenge areas and desires of vISPs. To attain this objective, the study utilized both interview and questionnaire survey. In depth personal interview was made with Ethio telecom management members, vISPs' top management members and fixed broadband internet users from vISPs to understand fixed broadband internet service delivery practices by vISPs and to participate the majority of the target population 40 questionnaires were distributed across ethio telecom staffs and vISP management members and staffs in Addis Ababa and 13 interviewees were also selected from ethio telecom management members, vISP top managements and enterprise and residential internet users from vISPs. This paper used descriptive research design in order to obtain information on the impact of the intervention on the field of fixed broadband internet service provisioning being studied and draw conclusion from the facts discovered. Both qualitative and quantitative methods were employed. Qualitative methods were deployed to fill the gaps from secondary data collection and from points incorporated on the questionnaire and describe detail of points and narrate open ended questions in the questionnaire whereas quantitative methods were used to show the level of agreement in percentage for the given sentences related to the intervention. After data collection, the collected data was analyzed, organized, tabulated, depicted, and described in a way that can attain the objective of the study. Finally, the finding shows that the intervention of vISPs in the field of fixed broadband internet service has brought significant changes related to short delivery time for the service, service delivery at discounted tariff, better monitoring of service quality, enhanced pre & post sales service, customized offer & customer service, adoption of international experiences and introduction of new technologies. Besides, the three vISPs reached 8063 end users from their start of service time and procured 7200Mb bandwidth of fixed broadband internet service and paying 2,114,760.48 birr for ethio telecom every month for the bandwidth rented.

Key Words: virtual Internet Service Providers, Value addition, Customer base, Bandwidth, Service delivery.

CHAPTER ONE

1. INTRODUCTION

This chapter presents the background of the research, statement of the problem, research questions, research objectives, significance of the study, scope and organization of the study.

1.1 Background of the Study

Investigation results by PCCIP (1997) revealed that for large corporations and small businesses, government and private organizations, educational institutions, consumers, and individuals, the internet has become an integral means for conducting business, engaging in commercial activities, and simply communicating and it is viewed as critical infrastructure and its contribution to economic output is growing. Besides, González and García (2012) cited by JM Ramírez Hurtado and C Paralera Morales (2016) explained that without a doubt, the expansion of the Internet is a driving force of economic growth in many countries, which contributes, on the one hand, to the development of the cultural and creative industries and, on the other, to the digitalization of the business and institutional sectors.

Today, the Internet has become an essential tool of communication and work, both in domestic and business environments. Currently, it is very difficult to conceive every-day life without the Internet. People use this tool primarily to obtain information, to carry out electronic commercial and banking transactions and to interact with other people, among many other things. Without a doubt, the Internet has also become a fundamental tool in the learning processes of many young people (Boza and Conde, 2015). Moreover, in recent years the Internet has prompted new forms of delivery through various platforms like offering internet services under its own company or brand name, while actually using the equipment and facilities of another Internet Service Provider to provide those services and they are called virtual Internet Service Providers (vISPs).

In Ethiopia, the first phase launch of virtual Internet Service Providers service was validated with effective date of June 30, 2017 with commercial circular reference number ET/MCD/P&S/71/2017 with the purpose of a) Boosting broadband internet penetration & increase revenue; b)Motivating private sectors'participation in the internet market; c) Delivering efficient internet service to our

customers and d) Creating sense of competition on the service delivery and thereby to assure the service improvement.

However, even if the validation for the commercial launch was June 30, 2017, due to other expected arrangements like work process, contract arrangement and internal & external awareness creations, and partner side preparations the first virtual Internet Service Provider (vISP) partner 'WebSprix IT Solutions PLC' started operation as of April 20, 2018 followed by 'G2G IT Solutions Share Company' and 'Vivatech Trading Plc' that started operation as of May 24, 2018 and March 19, 2019 respectively.

Even though, the aforementioned partners and other lately joined partners are in operation and they are purchasing internet service at wholesale level from ethio telecom and retail it to end users for more than two years, there is no research done on the field to assess whether the partners are meeting the expected targets or not and what impact the partners brought to the field of fixed broadband internet service provisioning.

1.2 Statement of the problem

Ethiopia having incorporated the Sustainable Development Goals (SDGs) into its development planning, as per the Second Growth and Transformation Plan (GTP II) Midterm Review Report of the National Planning Commission (2018), the economy grew by 10.9 percent in 2016/17, maintaining its rapid pace of growth observed during the preceding ten years. It is also indicated that the growth was broad-based as all the three major economic sectors (agriculture, industry and services) contributed significantly to the rapid pace of the economy's overall growth.

Internet is a critical enabler, which unlocks human capabilities and creates an opportunity for mass interaction, in the development of a country. International development literature by Dalberg (2013) confirms this idea revealing that it has a vast potential for wide-ranging growth and socio-economic development. Madon (2000) also clarified that internet service creates a chance for innovation and increase people's freedoms and access to government services by connecting remote populations to markets, promoting citizens' access to social service and expanding educational opportunities.

With these contexts governments worldwide focus on the expansion of internet service and according to the consumer survey result report by Statista (2020), almost 4.66 billion people were active internet users as of October 2020 which is 59% of the world population but the report also reflected that 91% of internet users are using mobile as a channel for internet access. This means only 9% of the total 4.66 billion internet users are accessing internet via fixed broad band channel which has the advantage of unlimited downloads, cheaper, wide availability, TV options and fast internet service and that is why countries working on fixed broad band internet service expansion with the participation of Internet Service Providers.

According to a publication by Faria (2020),in 2020 internet penetration rate in Africa stood at 39.3 percent and that means roughly 4 in each 10 individuals in the continent use internet. A report by Global System for Mobile Communication Association (2021) also revealed that Covid-19 pandemic has had an insightful impact on the digital landscape around the world. Similarly, the mobile industry in Sub-Saharan Africa has largely risen to the extent that operators face challenges on closing customer requests and keeping individuals & businesses connected during the pandemic. However, it is reported that nearly 800 million people in the region still not connected.

As per the research finding by Adam (2019), Information Communication Technology sector is a national priority that has impact on the entire economy and society. However, Ethiopia is one of the last countries in the world to have a monopoly national telecom operator and also the finding revealed that only Cuba, Eritrea and Ethiopia have not applied the 1st round reforms commenced by other African states from the 1990s and that is taken as the main reason for falling behind in terms of its Information Communication Technology sector development and not able to get closer to Africa's most populated nations like Egypt and Nigeria and its neighbors Kenya and Sudan that have the highest Information Communication Technology penetration among countries in Africa and even unable to meet the penetration of Mali and Rwanda that has equivalent GDPs per capita. The International Telecommunication Union ICT Development Index (IDI) of 2017 also confirm that Nigeria and Sudan's ICT Development Index is 1.5 times that of Ethiopia's and Kenya's ICT Development Index is twice that of Ethiopia.

Thus, it is expected that governments and policymakers should implement policies to enhance access for connectivity and motivate investment in digital frame. It is rational that, the environment with multiple service providers focusing on their specific areas gives the opportunity for service improvement than a single or a few number of service providers covering a wide area. Ethiopia having a single state owned telecom operator that is providing telecom services all over the country, will have limitations on shortening the delivery time, maximizing revenue from fixed broad internet sales via reaching to numerous; experiencing close relationship with customers and giving soonest solution in case of failure.

With this understanding, in Ethiopia with the purpose of motivating private sectors participation in the internet market; boosting broadband internet penetration & increasing revenue; delivering efficient internet service to customers and creating sense of competition and improvement on the overall service provisioning, launched virtual Internet Service Providers service effective from June 30, 2017 with circular number ET/MCD/P&S/71/2017.

However, to my knowledge, no assessment is done on the level of virtual Internet Service Providers on meeting the defined purpose. Hence, this thesis evaluates the top three virtual Internet Service Providers in Addis Ababa that have more than two years' service time to determine where they are against the given initiative and analyze what challenge they have on their service provision and what they require from ethio telecom to perform better and thereby propose ethio telecom top management members on the necessary business model amendments (if any).

1.3 Research Questions

The aim of this basic research question is to critically evaluate the impact of virtual Internet Service Providers intervention on the provisioning of fixed broadband internet service during the last two to three years. Specifically, to come across the defined objectives of the study, this research intends to answer the underneath research questions after collecting the information from stakeholders and analyzing the data. These questions are:

- What are the changes achieved in the field of fixed broadband internet service delivery and after sales customer support issues with the participation of vISPs?
- Is there sense of competition amongst vISPs to attract more end users?

- What looks like market penetration capacity and revenue generation practice of vISPs?
- What are the challenges hindering vISPs from attaining the expected outcomes and what are the need of vISPs to perform better and achieve objectives?

1.4 Objectives of the study

General Objective

The general objective of the study is to assess the overall impact of private virtual Internet Service Providers (vISPs) in the field of internet service provisioning in Addis Ababa.

Specific Objectives

In alignment with the expected outcomes from vISPs participation in the field of fixed broadband internet service provisioning, the specific objectives of the study are to:

- Assess on the effects of vISPs related to fixed broad band internet service delivery and after sales support issues
- Inspect on the nature of competition amongst vISPs to attract more end users
- Examining the market penetration capacity and revenue generation practice of vISPs
- Investigate on the challenges hindering vISPs from meeting objectives and on needs of vISPs to support on achieving the expected out comes.

1.5 Significance of the Study

Amongst the strategic themes of ethio telecom: financial capacity, service quality, partnership management, operational excellence and continuous incremental improvement are the main once that are directly related to the purpose of vISP business model launch. Specific to fixed broad band internet service: service penetration, quality of service, customer satisfaction and revenue maximization are the major objectives of the business model expected to be supported with the involvement of the private sector. However, the engagement alone couldn't guarantee success on bringing the required improvements but it needs regular assessment to identify challenge areas and make necessary amendments to better support vISPs to meet the defined objectives.

Hence, based on the impact assessment results identified by this research, the researcher will put forward recommendation that would help ethio telecom to revise and improve its vISP business

model and give solution to the challenges. Besides, the study can be used as a reference material for further studies by other investigators and companies that have been working on related researches.

1.6 Scope of the Study

Geographical scope: Since, the service providers' focus is highly limited to Addis Ababa area and only a few trials have recently started by vISPs to deliver the service across Addis and only three of the existing vISPs have more than two years' service time. The study is limited to Addis Ababa area and focusing on the leading three vISPs.

Conceptual scope: This thesis focuses on assessing the impacts of private vISPs on internet service provisioning in Ethiopia, their penetration capacity, bandwidth consumption and tendency of changing the existing situation on the service provisioning and its challenges by using operator side concerned staffs and management members, vISPs and fixed broad band service users from vISPs.

Methodological scope: The study is to be conducted on the three top leading vISPs amongst others that are recently joined the partnership and providing internet service and the selected three vISPs have more than two years of service time possibly to see on the changes created by the vISPs.

1.7 Limitation of the study

To meet purpose of the study and address all research questions, it focuses on the feedback of ethio telecom employees and management members, vISPs and their end users. Besides, secondary data like vISP business model circular, contact agreements, work process and other related communication and report documents are used to understand the business practice and on this regard the researcher tried to incorporate all the concerned stakeholders and necessary documentations. Although, one of the vISPs has recently expanded its service delivery to the regional parts of the country and have three active sites focused on three enterprise users but the study on its data collection from end users focuses on the better experienced users in Addis Ababa.

1.8 Organization of the Study

The research paper is categorized into five chapters. The first chapter is the introductory part that includes background of the study, statement of the problem, research questions, objectives of the study, significance of the study, delimitation of the study and limitations of the study. The second chapter presents related literature review about the topic under discussion. It has conceptual and empirical literatures conducted related to the subject. Chapter Three focuses on research methodology used and under this chapter research design and approach, target population. sampling technique and sample size, data type and source, data collection instruments, data analyzing techniques, data validity and reliability and ethical consideration are presented. Chapter Four presents on characteristics of respondents, data organization and presentation, discussion of results and interpretation and Chapter Five presents on summary of the findings, conclusions and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

A literature review is an assessment on the existing level of knowledge on the selected specific topic and identify the gaps via examining relevant publications. It enables to interpret recent literatures on progressive manner and defines how the planned research is related to preceding researches and see contradictions within the findings in the field.

This chapter will cover theoretical and empirical literature review and conceptual framework. The theoretical framework includes an in-depth understanding of concepts of impact assessment, the purpose of impact assessment, types of impact assessment, measurement, assessment and illustration, links to theory of change, challenges of impact assessment, significance of Internet, Internet service adoption and penetration and the vISP business in Ethiopia. On the other hand, the empirical literature review includes summary of related literature investigation results and studies conducted in the internet industry.

2.1 Theoretical literature

2.1.1 Concepts of Impact Assessment

According to a research report by a not-for-profit consultancy and research institute called INTRAC for civil society (2017), impact assessment is about focusing on changes and paths to change to measure the long-term and/or significant changes got due to an interference to an area. Which means it evaluates long-term and significant change, long-term but may not be significant change, and may not be long-run but significant changes attained following the intervention done to some defined portion. Here the definition is not limited with the time length but considered the possibility of having significant effects of interventions even in the short-term.

The definition for impact is not limited with the aforementioned and there are other two most commonly known definitions. As per the definition given by OECD (2010), impact is about long-term effects produced by a development intervention done directly or indirectly, planned or unplanned and the results may be positive/negative and primary/secondary. On the other hand,

Roche (1999) defined impact as a sequence of actions brought in people's life and the change may be lasting/significant, positive/negative, intentional/unintentional. Between these two definitions there are different interpretations OECD's interpretation is wide and refers only long term effects whereas Roche's definition includes short-term significant changes but narrowed with the changes in the people's life only. For the selected impact assessment both necessary time duration expectations are fulfilled and again possible short-term significant changes to be checked.

In some circumstances, the term 'impact' can be used interchangeably with words 'results', 'outcomes' and 'effects' and this directs as the expression 'impact assessment' is a difficult concept to define specifically. Capturing the different circumstances on defining the term impact by development agencies, Hearn and Buffardi (2016) tried to show the understanding variations from agency to agency. As per their finding, the most dominating understanding for the term 'impact' is it covers changes that take a long-time to emerge and may fluctuate over time. Followed by interpretation as it is an average change across target population. It is also defined as it includes changes in the lives of members of the target population only. Besides, it is taken as a measured or assessed change during or after an intervention.

Furthermore, it is defined as it covers wider change, including unexpected or negative change. Still it is deduced as it includes changes indirectly influenced by an intervention and in the contrary to this interpretation it is understood as it is about changes directly influenced by an intervention only. It is also narrowly defined in terms of specific, predicted changes. Likewise, it is interpreted as it is a desirable or hoped for change, defined at the planning stage. As well it is taken as it includes changes to institutions, policies, the environment, etc. Widely it is too understood as it is assessed separately for different groups/contexts. As per the finding in sequential order the term 'impact' is less dominantly interpreted as it is for fairly immediate changes, seen within the lifespan of an intervention. The research finding also described that the way in which the term understood will have a profound effect on how the researcher approaches impact assessment.

The purpose of impact assessment

Regarding the purpose of impact assessment, according to Hailey and Sorgenfrei (2004), the underneath four points are the main reasons for conducting impact assessment:

- To improve the effectiveness of current and future interventions, understanding long-term

or sustainable changes that have occurred serve as a base

- To help donors, supporters, partners and beneficiaries to create accountability
- To use the study outputs as a source for necessary changes in policies, strategies and practices
- To motivate staff and other stakeholders, justify funds received, and solicit further funding via communicating achievements internally &demonstrate long-term successes

Likewise, from this research study outputs it is intended to recommend on the necessary changes on the business model, guidelines and work processes to improve effectiveness and create accountability on the partners' missing parts and motivating staffs and other stakeholders that have contributed on the service provisioning.

According to O'Flynn (2010), here the underneath are points expected to be addressed by evaluators during their impact assessment:

- To examine on what has changed related to the intervention and it is an investigation on the change points.
- The groups that have been affected (or unaffected) by the changes which is an inspection on the impacted groups and individuals.
- The way the changes brought about which is how question on the bringing the improvements.
- The significance of the change is about how much the change is valuable and important
- Length of the change to check whether the changes achieved are permanent or temporary with short duration.

Thus, with this consideration the study will check on what changes achieved, how the changes brought, who are the affected groups and how much the changes are important and their length.

Categories of impact assessment

As per the literature by INTRAC (2017), there are different ways of going about impact assessment but the approaches are not mutually exclusive and may be carried out through multiple different methods. Here the below stated are the most common ways to carry out impact assessment:

- An assessment that takes place at the end of a project or program which is a type of impact

evaluation that seeks to assess actual change compared to anticipated change and the evaluation is led by external experts.

- An assessment carried out a while after the completion of a project or program and it is to evaluate changes sustained after the project or program finished.
- An assessment carried out throughout a project or program which is known as impact monitoring and done by inserting questions on impact into an organization's monitoring processes, and by assessing change on an ongoing basis.
- An assessment studies often begin with a baseline study at the start of a program and may continue until well after the program has ended and that are resource intensive and costs a lot of money and staff time and done by larger agencies to evaluate the impact of their program work.
- An assessment carried out at all stages of the project or program cycle and it is a participatory approach type that involves different stakeholders, including beneficiaries, to check on those changes have been realized.
- An assessment that carried out at the same time as projects or programs, at the end, or sometime afterwards.

This study is categorized under an assessment which is carried out throughout a project and it is a checking type of assessment on the effectiveness in comparison with the initiatives and to examine how much the intervention is changing the existing trend on fixed broadband service provisioning and it will be done on an ongoing basis.

Challenges of Impact Assessment

Besides the above mentioned challenges on defining the term 'impact' and knowing where to look for change, according to INTRAC (2017), there are also some other challenges that are common to impact assessment developments.

- It costs a great deal of time and money. Since conclusions and recommendations need a fair degree of certainty and to be used to shape future development interventions, establishing change at individuals and communities is very difficult and time consuming. For this research case time given seems sufficient but still to come on conclusions and

recommendations with certainty, planned strictly to follow schedules and work with dedication till the final submission date.

- In the case that projects or programs are being delivered by multiple organizations, it is difficult to work out what is being achieved by each and not even clear who should carry out the impact assessment. As per the concern, this study also covers three different organizations but the results of the three vISPs for the selected parameters to be reflected separately to enable see the contribution of each vISP independently. Furthermore, since the main aim of the study is to evaluate on the sum impact achieved by the vISPS in the field of fixed broadband internet service provisioning, it will not be a concern.
- It is again challenging to decide where change can be accurately measured and for all the changes a single one side intervention couldn't be set as a reason and decide as it is the result of that intervention only because there are multiple influencing factors. But for the case of this study all the needed measures can be quantified and identifying contributions and changes will not be challenging.
- There are also challenges on choosing tools and methodologies amongst the deferent possibilities by designers. On this study to meet the predefined objectives of the research, the number of fixed broadband internet users from vISP, bandwidth consumption and revenue generation by vISPs, service delivery and maintenance time changes brought by the vISPs, and challenge and improvement areas are the main indicating tools to assess the impact of vISPs on fixed broadband internet service provisioning.

2.1.2 Significance of Internet

Research findings by Keiser (2000) reveals that the most important need of people since the ancient times has been communication. With the passage of time many forms of communication have been developed and the motivations behind the new form of communication was basically either to increase the transmission distance between different transmit stations or to increase data sending capacity and enhance the transmission accuracy.

With the advancement of technology there are new ways of communicating with people far and near. One of the most commonly used one is internet connection and there are diverse means of

gaining access to the internet. The two main categories of internet service are Narrow band and Broad band and each of them has its own advantages and disadvantage.

In accordance with the finding by Ofcom (2009), the term "broadband" was initially introduced by differentiating from dial-up service and it is characterized by two distinct characteristics which are speed and always on. As per the definition given by Lee (2007) Broad band is one type of internet with high speed internet access and can be used on unlimited basis to connect for small and large business activities to all residential and enterprises and it is used to access a connection for all operation to execute their business and improve work efficiency and effectiveness. Following the suggestion given by Madakam, S. R. and Tripathi, S. (2015), there is no world economy users acceptable unique definition available for internet and one type of definition given is broadband internet as always on, fast downloads and uploads stream internet access technology to run out world economic activity.

On the other hand, differentiating from dial-up access and including transmission technologies, Chinecherem V. & Aronizang (2015) defined broadband internet as high speed internet access faster than the out dated dial- up access and it includes several high speed transmission technologies like digital subscriber line (DSL), cable, fiber, wireless and satellite. Consistent with its special characteristics Ofcom (2009) also defined as a high speed network that focuses on fiber and have the capacity to support future applications, universal seamless and next generation connectivity and universal access focusing on the best media of preference and expected functionalities.

According to international communication union (ICU) suggested that a connectivity to be called broadband internet should guardant internet connection speed of 256kb/s and greater speed symmetrically for both download and upload streams. All the previous explanations on defining broad band internet service focused on its high speed capacity even if it is not defined with the minimum bandwidth required like the definition given by ICU.

As we have seen the overall significance of internet service, it will not be difficult to understand the contributions of broadband internet service. On this regard Dwived (2007) explained on the significance of broadband internet technology as it contributes for fast growth of world economy and peoples' life style improvement via quality education delivering, health care and communication accessing high speed internet service at low cost. In line with this Angele &

lennard (2008) also defined broadband as a high speed internet access technology that enable users send and receive data through a greater speed but still using current traditional telephone lines.

Following the contribution of broadband internet service for the economy and societal life, governments invest huge amount of money and also invite private organization to invest in the expansion of internet infrastructure. In accordance with the categorization by Angele and Lennard (2008), there are varies transmission media or technologies used to deliver broadband internet access like:

Cable: -adapting the same cable network being used for television services, can be used to provide broadband internet access. The drawback for using cables is possible access speed limitations specially during peak hours related to shared nature of the service. vISPs are expected mainly to use as their secondary infrastructure and incoming to the end users' premises.

Digital subscriber line: - is a modem technology that changes existing copper telephone lines in to two-way high speed data conduits. The problem on using DSL is its bandwidth capacity depends on the distance from source network element. Whether it is SDSL or ADSL vISPs are expected to use as their last configuration point for the service delivery.

Wireless: -a type of service that uses radio link between the customer's location and the service providers' facility and it may be mobile or fixed wireless type that transmits data over the airways from towers or antennas to receivers. This technology not expected to be used by the vISPs and more appropriate to be used by ethio telecom as it is somewhat costly but to be checked during survey arrangement.

Fiber: - is high speed links for long distance voice and data traffic that guarantee the needed bandwidth amount with no drop. For the vISP purpose ethio telecom is expected to create access in the nearby area to enable vISP's to deliver the service with no long installation. However, to assure the service quality and deliver symmetric bandwidth still may prefer fiber cable.

Satellite: - it is a service offered by three network providers: Hughes Network system, Star band and wild Blue and its downstream and upstream speeds for satellite broadband depend on several factors such as the provider and service package purchase, the consumer's line of sight to the orbiting satellite, and the weather and it is out of the scope of the vISPs.

Based on the delivery mechanism, broadband internet service is classified in to fixed line and wireless technologies. There are some competing technologies that enable providing the broadband service, but each technology has its own limits in terms of bandwidth, reliability, cost and coverage. However, amongst the alternative tools, optical fiber offers almost limitless bandwidth capabilities and has excellent reliability. On this regard, copper and wireless technologies are also developing at a significant pace to meet the ever increasing bandwidth requirements of the consumer.

Study results by Diane (2016) explained that in our rapidly changing world, technology is impacting every part and parcel of our daily life via impacting how we contact work for economically, socially, environmentally, politically and so on. Remarking on the preference of broadband connectivity, Dwived (2007) explained as broadband internet is better to enrich our life style and entertainment such as enriched education, world class health care, improved public services and safety, internet of things and tele work.

However, in accordance with Goodman, Press, Ruth & Rutkowski (1994), there are barriers that are hindering the wider distribution of internet in developing countries such as government policies, laws and habits or adoptions of internet. As per the investigation by Mbarika and Byrd (2009), there are also other factors impacting the development of internet in the countries like: government regulatory policies, local capacity, domestic and foreign investment in ICT, self-sufficiency and degree of privatization of telecom sector or monopolization.

2.1.3 Internet Service Adoption and Penetration

A research finding by Wilson (1999) reveals that there are significant differences highlighted through the comparison of internet adoption and penetration rates in Africa compared to Europe & USA and reflected that they faced instinct challenges and there are distinct differences in the approach that developed and developing countries take when adopting the Internet.

Several research findings revealed that, in the way of Internet adoption and penetration in developing countries barriers that hinder the way and the below listed are the most common once:

Costs

It is obvious that there is a gap on GDP among developing and developed countries and according to Kiiskiand Pohjola's (2002), there is a strong relationship between gross domestic product (GDP) and

Internet accessibility in countries. Hence, developed with their advancement on per capital income will have better internet adoption and penetration than that of developing countries. On the other way since internet also contributes to the economic growth, again it will have impact on widening the gap between income classes among developed and developing countries.

Consistent with research findings by Roycroft & Anantho (2003), In Africa people would pay for basic services such as water, electricity, and sanitation and Internet is not classified as a basic service nonetheless, in the developed world Internet adoption and penetration are high because itis classified as a basic service. The study also revealed that related to this many African people don't have access to computers due to high equipment and maintenance costs. Another finding by Kiiski & Pohjola (2002), since internet is made up of several components and each component has an associated cost like costs of the access medium, subscription and equipment have an effect on internet diffusion.

Though, with the engagement of vISPs in the field of fixed broadband internet service provisioning, sense of competition arises and that may cause a decrease in the price of internet service with the interest of having large market share.

Regulatory Influence

As per the research finding by Brousseau, Marzouki & Meadel (2012), competition within the market and internet penetration significantly influenced by regulations in a country. Likewise, in this study the selected vISPs will be checked if they have any challenge hindering them from delivering the service to many and increase their penetration.

Education and Its Impact On Internet Adoption

Research findings by Kiiski & Pohjola (2002) and Roycroft & Anantho (2003) confirmed that as the basic literacy skills such as reading and writing are fundamental when using internet, education influences Internet distribution. Besides, in accordance with the finding by Kiiski & Pohjola (2002), knowledgeable people tend to adopt new technologies faster than the uneducated. This study again confirmed that being fluent in English is another factor that positively influences internet penetration.

But still the issue is even if the society have the knowledge and skill to use internet, if there is a gap on the service provisioning and after sales issues, well-aware and interested individuals and

enterprises couldn't have the access for internet. Hence, what vISPs have improved in the field of internet service provisioning and how is the trend on the number of internet service users after the intervention of vISPs highly matters.

Basic Internet Infrastructure

In line with the investigation results by Roycroft & Anantho (2003), lack of basic infrastructure for internet access like electricity and telecom infrastructures, affects internet penetration and the majority of African countries faced with these challenges mainly in their rural parts and that negatively affects internet adoption and penetration, whereas countries like the United States (US) are typical examples of this claim. Another research by Ohemeng & Ofosu-Adarkwa (2014) explained that even if developing countries invest less in Information and Communication Technology (ICT) and telecommunications infrastructure prioritizing their expenditure on basic services, their investment in Information and Communication Technology (ICT) and telecommunications infrastructure was also to strengthen and grow the economy.

Regarding the economic condition of Africa, according to the study by Roycroft & Anantho (2003), no wonder if countries in Africa have severely lower Internet adoption and penetration rates compared to the developed nations like USA and Europe because level of economy is contributing factor to Internet adoption and penetration. Same study revealed that no high-income countries in Africa and only five countries namely South Africa, Mauritius, Gabon, Réunion, and Seychelles are categorized under upper-middle-income countries.

This looks critical problem in developing countries as they lack internet access which is the key contributor for economic growth and societal life style development and to work on internet access part they lack even the basic pre-condition that is electricity and telecom infrastructure and again to invest on these infrastructural portions, unable to surpass from their basic necessities. Thus, the superior resolution seems attracting foreign investment to work on these infrastructural and internet access issues and monitoring their performance on meeting objectives.

According to Lewis (2005) cited by Naidoo in the late 1990s saw an increase in the use of the Internet for commercial purposes and the Internet commercial domain generated much interest

among both customers and Internet Service Providers (ISPs) and was seen as a channel of distribution. But in Ethiopia's case no doubt that the technological adoption and internet penetration of country is low compared to other world countries. Because, till recent times services like internet service provisioning were monopolized and owned by government only and there was no market competition and option to select the best provider.

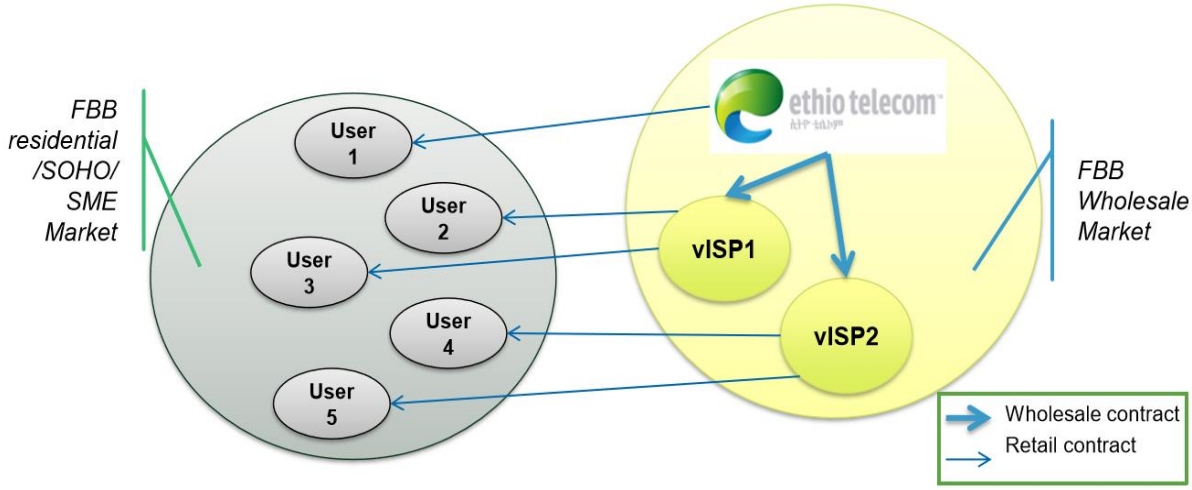
Recently in Ethiopia the first phase launch of vISP service was validated with effective date of June 30, 2017 with commercial circular reference number ET/MCD/P&S/71/2017 with the purpose of a) Boosting broadband internet penetration & increase revenue; b) Motivating private sectors participation in the internet market; c) Delivering efficient internet service to our customers and d) Creating sense of competition on the service delivery and thereby to assure the service improvement.

2.1.4 vISP Business in Ethiopia

As per the definition given on ethio telecom commercial circular number ET/MCD/P&S/71/2017 (2017), vISP is a company that offers Internet services under its own company or brand name, while actually using the equipment and facilities of another ISP to provide those services. From this definition ethio telecom will sell internet service to vISPs at a whole sale level and they will retail for final users with or without additional values.

As per the engagement guide on the above mentioned circular, to be a vISP, a company needs to have a Value Added Service license and a wholesale agreement with ethio telecom and then the vISPs will compete with the wholesale service provider (Ethio Telecom) in the selected market segment by providing a competitive offer, provisioning, maintenance and customers services. In addition to the basic internet service, vISPs can provide additional Value Added Services like Video on Demand, IPTV and others and to give these services, vISPs are expected to make some investment.

Figure 1: ethio telecom and vISPs market segment approach



Source: ethio telecom business circular No. ET/MCD/P&S/71/2017

To explain the diagram above on its reflections:

- Ethio telecom has no contractual relation with Users 2-5 as it has no direct contact with them but they are internet subscribers from vISPs.
- As the users from 2-5 are customers for the vISPs, for technical support needs they are expected to contact vISP's not ethio telecom.
- vISPs (vISP1 and vISP2) in the diagram are customer of ethio telecom in the wholesale market.
- vISP is a competitor of ethio telecom in the retail market and when ethio telecom deliver the service, the vISP also will retail in the market adding values to be preferable.

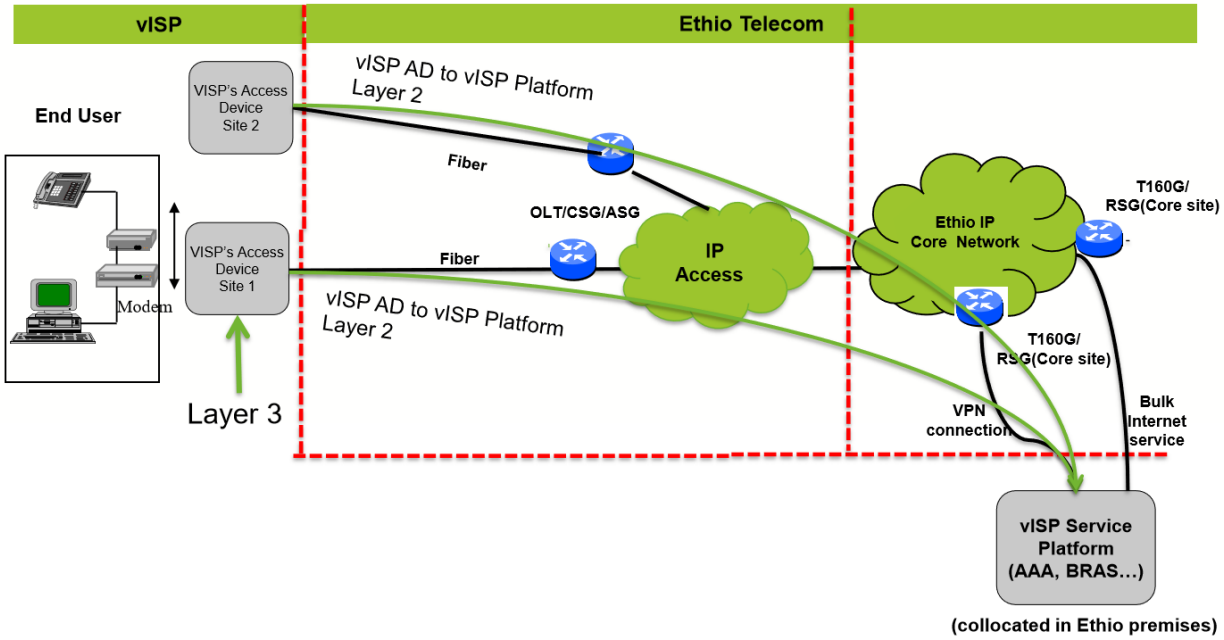
vISP Model

As per the given commercial circular number ET/MCD/P&S/71/2017, there are two types of service provisioning method proposed partners to enter in to the partnership as per their preference.

A. The vISP Technical Model 1: according to this technical model the vISP will deploy its own infrastructure/secondary network after its access devices.
B. The vISP Technical Model 2: With this technical model the vISP will use ethio telecom's secondary network after its access devices.

A. vISP Technical Model

Figure 2: vISP technical model showing secondary network deployment by the vISP



Source: ethio telecom business circular No. ET/MCD/P&S/71/2017

The above diagram reflects that:

- The wholesale internet capacity the vISP subscribed and will retail to its end users will be connected to its service platform.
- The vISP service platform will be collocated in ethio telecom premises and will be connected to Ethio Network.
- After subscribing to a wholesale internet service, the vISP will have multiple access devices from which it will retail the wholesale capacity.
- With this technical model ethio telecom will provide the connection up to vISPs Access Device (MDU, MSAG, Modem…) via fiber which will be connected to Ethio IP network using fiber cores from different Ethio equipment.
- The vISP access device (MDU, MSAG…) should support all types of services that are capable of different technologies including xDSL, xPON and multiple GE cards in order to manage the current customers demand.
- After its access point vISPs will handle the secondary network deployment, internal cabling and will have their own service platform with different infrastructures.

- When the vISP service platform is collocated in Ethio's premises, a connection to the vISP's office to remotely access the service platform using the following options:

  A, The vISP can use internet/VPN service from its access device without any involvement of Ethio telecom or

  B, The vISP can subscribe internet/VPN service from Ethio telecom and can be connected to its service platform.

- From the given technical model:

  Ethio Telecom's role:

  - ✓ Sell internet at a wholesale level and it will be a resell for ethio telecom from what is purchased from international connection providers.
  - ✓ Providing a connection to the vISP service platform which connects to ethio telecom's IP network.
  - ✓ Providing a connection up to vISPs access device via fiber which connects to ethio telecom MPLS network from different equipment.
  - ✓ Providing a connection to vISPs office to remotely access its service platform from office with no need of ethio data center entrance.
  - ✓ Providing backup connections.
  - ✓ Service maintenance when these connections are down.
  - ✓ Collocation for their server, IP address per the vISPs need and call center hosting .

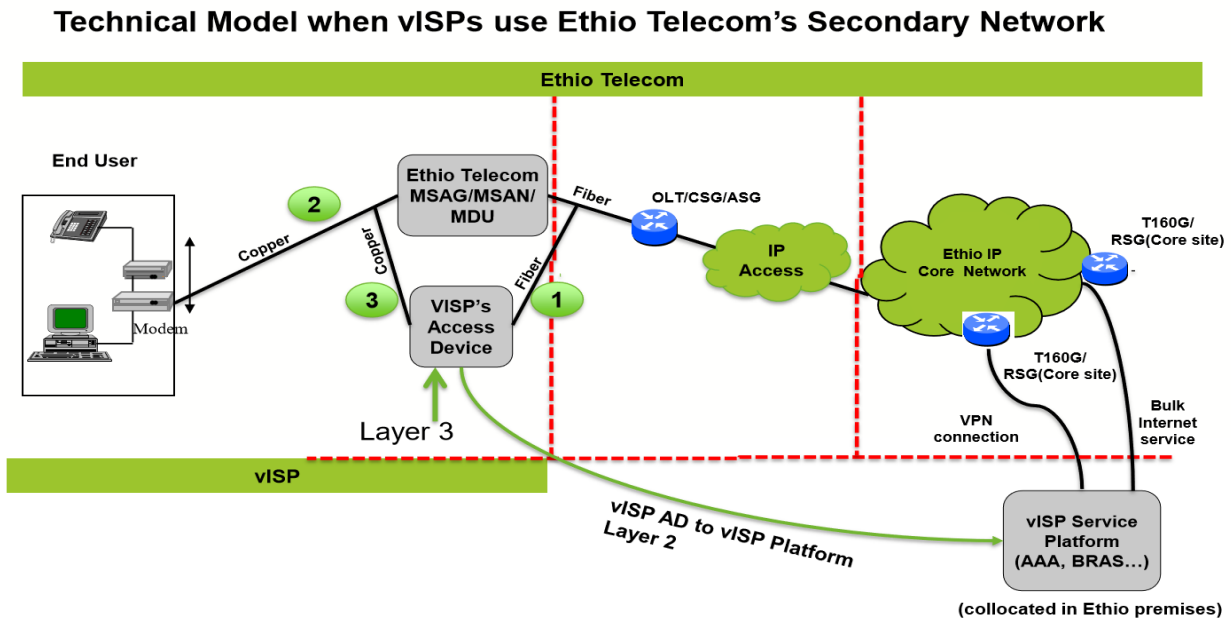
  vISP's role

  - ✓ Promote its service with its own brand name and find new internet subscribers to meet its target given by ethio telecom.
  - ✓ Providing internet service to end users after its access device.
  - ✓ Maintaining service failures after its access device. End users will not contact ethio telecom for provisioning and maintenance request.
  - ✓ vISPs can provide content services and may add QoS parameters to have common quality standard to guaranty.
  - ✓ The vISP will invest in service platform, sales, delivery, maintenance, billing and monitoring system.

B. vISPs Technical Model 2

- ethio telecom will allow vISPs to use its secondary network infrastructure in areas where secondary network deployment is already completed.
- To use the infrastructure vISPs will pay monthly rent per line (Appendix 1)
- ethio Telecom will be responsible for the maintenance of these secondary lines during failure.

Figure 3: vISP technical model when vISP using secondary network of ethio telecom



Source: ethio telecom business circular No. ET/MCD/P&S/71/2017

From the above diagram showing the technical model when vISPs use ethio telecom's secondary network

1. Indicates the fiber line which is tapped from the back of ethio's MSAG/MSAN/MDU and connected to vISP's access device
2. Indicates the secondary network deployed by ethio telecom from its MSAG/MSAN/MDU to its end users' premises and as per the demand 100 or more secondary lines may deployed
3. Indicates ethio telecom's secondary lines that a vISP can use like from the 100 secondary lines deployed by ethio telecom the vISP may rent 30 of them and provide internet service

to its end users. These lines will not enter to ethio telecom's MSAG/MSAN/MDU instead it will be connected to vISP's access device.

- Although physically these lines are ethio telecom's, it will be connecting to vISPs service platform via the VPN connection created.
- With the remaining 70 secondary lines ethio telecom can provide its own service to its own customers.

BUSINESS RULES AND PROCEDURAL APPROACHES

On the implementation of the vISP service provisioning there are defined guiding rules that are currently working on the engagement of new partners and operation of the existing.

Initially the vISP expected to have renewed Value Added Services license which is issued by Ministry of Innovation and Technology together with other legality documents like trade registration, business license, VAT certificate, TIN number and House rent agreement. Besides the mentioned documents, the vISP expected to bring application letter and a proposal showing their technical and business plans including the vISPs minimum of three years' growth plan of bandwidth, number of access sites and customer base and their detailed tariff documents of their retail business validated by Ministry of Innovation and Technology expected to be submitted.

Following their application, the vISP is expected to put its platform in ethio telecom commercial data center found in Arada sub city and side by side the sales team will arrange the vISP contract agreement for the service provisioning. Then the vISPs work on demand assessment in different areas and bring letter with a list of selected sites together with wholesale internet activation request which is defined to be a minimum of 100Mb bandwidth.

The sales team will manage the wholesale activation and access site requests and communicate the partner on the necessary payment issues. In ethio telecom's customer category, vISPs will be treated as key account (corporate) enterprise customers and serves the residential, SOHO/SME, key account markets with no limit in ethio telecom market segmentation.

Regarding the service provisioning method, creating a Wi-Fi hotspot for communal use purpose (except for in-house use) commercial or promotional purpose is prohibited and the service

provisioning method should be wired. Again all vISP customers also not allowed to create an open/free/priced Wi-Fi hotspot for commercial purpose.

Once purchased wholesale internet capacity can be distributed among different vISP access points in different locations. There is no limitation in the location of the access devices within the country and can be even in regions and the number of access sites is to be managed as stated here below:

Table 1: Bandwidth Vs permitted number of access sites

Wholesale Capacity purchased from ethio telecom in Mb	100	200	300	400	500	600	700	800	900	1024
Number of vISP access devices to be connected	3	7	11	15	19	23	27	31	35	39

From the above table with the initial 100Mb wholesale access speed the vISP will have three access sites and then after for every additional 100Mb wholesale capacity, the vISP will have additional four access device to be connected that means the vISPs can upgrade/downgrade the wholesale internet capacity. With the upgrading/downgrading of wholesale capacity, vISPs can add/reduce the number of access devices it connects to the purchased wholesale capacity.

A head of their service provisioning, the vISPs expected to have initial deposit of one month subscribed bandwidth monthly payment and the vISPs can rearrange their access devices capacity and location as per the demand of their market. vISPs can add Value Added Services, set their own service monitoring and QoS parameters and also they can apply their own contention ratio to residential and SOHO/SME customers with the validation of Ministry of Innovation and Technology (MInT). On their service provisioning vISPs will be responsible for service delivery and maintenance after their access point. But if the vIPS rent ethio telecom's secondary line, ethio telecom will be responsible for the maintenance of rented lines.

During service failure vISPs will register TT via 980 or contact their respective Enterprise or Customer Service representative and get maintenance service and can get any of the after sales like upgrading, downgrading, termination, reconnection, change of name, change of location and other current after sales services available for the current ethio telecom fixed broad band customers will also be applicable for vISPs.

2.2 Empirical Literature Review

A number of studies have been conducted on the mobile and fixed broad band internet service industries and the majority of the studies focus on mobile internet adoption, internet service quality, internet connection technologies; customers' perspective of internet speed, price, capacity, internet dimensions that are important to end users and the source of most Internet problems.

Hence, massive investigation on related literatures has done and realized that there is no research conducted in our country related to vISPs in the last about three years of their operation time and then decided to present some related empirical literatures on internet opportunities and connectivity conditions, service quality of broadband internet and determinants of demand for internet access in Addis Ababa and all suggesting the need for establishment of competitive environment on the service provisioning to assure quality network, good service provisioning and after sales support. Besides, studies conducted in Spain on preferences of university students on the choice of internet service provider and ISPs' service quality and level of customer satisfaction in the southern region of Malaysia is reviewed to take experience of possible improvement areas by ISPs to create sense of competition to attract more internet users. As the purpose of this thesis is also to assess on the impact of private vISP in Addis Ababa and the impact or the change that the vISPs brought on the field of internet service provisioning and their penetration are highly related with the quality of service delivered by the vISPs.

Fanta A. (1996) made a research on the topic internet as an information service: opportunities in Ethiopia and connectivity conditions a case study of potential internet users in Addis Ababa. Internet was defined as a system of interconnected computer networks which provides access to computers', electronic mail, bulletin boards, databases, and discussion groups, all using the TCP/ IP (Transmission Control Protocol/Internet Protocol) protocol and related to its importance

explained that connectivity facilitates quick economic, social and political transformation. To conduct an assessment on the opportunities and connectivity conditions of Internet service in Addis Ababa in the case of potential internet users, both interview and questionnaire survey were used to collect the data using stratified sampling method and a total of 121 sample of e-mail users were selected from five sectoral groups private or Individual, Academic and Research, Non-Governmental Organization, Governmental and International sectors and 90 of them have replied.

The findings of the survey indicate that a large number (>81%) of the respondents are aware of the internet, its benefits and pitfalls as well and it is also concluded that there is a fertile ground for Internet connectivity in Ethiopia in terms of telecom infrastructure, its acceptance, and need by potential users. Subsequent to the conclusions, the following are main areas of recommendations: the establishment of appropriate institution or management body to monitor the provision of the Internet; the government needs to seek fund from donor agencies for Internet connectivity; It is necessary to design user awareness programs on national level to increase the user base; and a future area of research is needed to develop a national script on the Internet for the country to sustain a successful Internet service in Ethiopia.

My point here is the study clearly described as there is fertile ground for internet connectivity in Ethiopia but the user base in our country is very low and for this awareness gap couldn't be a reason as more than 81% of the respondents are well aware about internet and its benefits to identify the gap it was batter if the researcher checked on the number of internet users amongst +81% well aware individuals and enterprises with 'if not' why justification point. Regarding the recommendation government to seek fund from donor agencies, if it is for related complementary infrastructures like electricity may be important as developing countries have investment capital limitations but if the intention is for direct investment on the telecom sector it doesn't make sense as ethio telecom has good financial capacity and the problem seems more of administrative. Thus, I more agree with the researcher's recommendation on the establishment of appropriate institution to work on the provisioning of internet connectivity.

Daniel M. (2019) conducted a research on topic service quality of broadband internet in ethio telecom a case study on enterprise customers in Addis Ababa for the purpose of investigating service quality of broadband internet service examining reliability and performance of the service. To conduct the survey, the researcher used a mix of both qualitative and quantitative research

designs and from all customers of broadband internet subscribers of ethio telecom defined as enterprise customers of broadband internet users of Addis Ababa key account and small office and home office and small micro enterprise, using a random sampling method 399 broad band internet service users were selected and 365 of them were responded.

Research findings indicates that tangibility is good in the company that followed by assurance, empathy, responsiveness and the company has good physical facility; equipment and communication materials from tangibility and have good habit of employee's politeness, knowledge and confidence to transfer service for customers. Unfortunately, the overall customer satisfaction of broadband internet has not good result and most the customers are not satisfied through the service quality of broadband internet. As per the researcher's observation of service quality gap, identified that there is gaps between customer perception and expectation. From all dimensions of service quality assurance, empathy, reliability, responsiveness and tangibility, customer expectations are not completely satisfied.

Finally, the researcher recommended as ethio telecom to hire professional to help customers; building the quality of network; equipment and physical layouts of communication materials should be latest; maintenance service of broadband internet should be based on promised time; to build continuous network infrastructure without any interruption; and training employees to have deep knowledge, technical skill and behavioral change to build quality of service on broadband internet service provisioning.

In the preceding study which is conducted twenty-three years ahead indicated that there is fertile ground for internet connectivity in Ethiopia in terms of telecom infrastructure, its acceptance, and demand but no significant progress is attained in the field of internet service provisioning. As well, on this study which is conducted on broadband internet service quality again reflected that there is good situation in ethio telecom; related to tangibility, assurance, empathy, responsiveness, physical facility, equipment and communication materials and on human resource part the company is worthy again in employee's politeness, knowledge and confidence to transfer service for customers. However, still the overall customer satisfaction of broadband internet service is not decent. Hence, it seems the problem is more of organizational and can be addressed only by dedicated and limited area focused private internet service providers' engagement.

Dereje F. (2006) made a research on the topic analysis of determinants of business demand for internet access in Addis Ababa. On this study categorizing the demand for internet service into three segments of users subscribers of dialup and leased line Internet services, those that access Internet through public access points and the monopolistic nature of the service provisioning or the prohibition of private business companies to take part on internet service provisioning and his hope on the idea of vISP future implementation, study on identifying the determinants of Internet diffusion among business organization in Addis Ababa is done. To conduct the study on internet access the study used field survey using questionnaires and distributed to a random of 250 business enterprises in Addis Ababa to be filled by top management of the enterprises and 240 of the enterprises have been collected.

The study results indicate that price isn't a factor to affect demand at least in the business community as around 81.8% of 176 businesses reported it to be medium, low(reasonable) or very low both for subscription and utilization charges. Rather firm socio-economic factors such as education, sales, openness to international trade, competition and sector of activity of the firm are the main determinants of access to Internet connectivity. It is also indicated that currently there is shortage of demand for Internet access as the take up of the services is lower. To tackle shortage of demand recently the operator has come up with the idea of Virtual Internet service providers (vISP) to participate the private sector in the marketing and distribution of Internet connections which can be seen as a positive move in the part of the government to allow the participation of the private sector in the development of the sector.

The results of the logistic models estimations done in this study suggests: the market structure of the Internet service in Ethiopia should allow competition and the participation of the private sector to have a role in the development and penetration of internet; government interventions on increasing penetration and network expansion should be strengthened; aggressive promotion and educational expansions for the promotion of ICT and Internet service in particular in the business organizations in Ethiopia.

The study on the determinants of internet business demand for internet access in Addis Ababa identified that price of internet service doesn't have significant impact on the demand for internet service. Rather factors like education, sales, openness to international trade, competition and sector of activity of the firm are the main determinants of access to Internet connectivity. Hence, this

implies that intervention of the private sector on the service provisioning will have major role on increasing the demand for internet and internet users base. For this not only the engagement but also the capability of the private organizations on changing the existing trend of internet service provisioning and their performance on meeting the initiatives highly matters.

Hurtado & Morales (2016) conducted a study on the topic Preferences of university students on the choice of internet service provider which is aimed to identify the factors that most influence consumers' choice of ISP companies as it is extremely difficult for consumers to determine which ISP is the most beneficial for them. To conduct the research conjoint analysis was applied to the answers of a sample of students of the Pablo de Olavide University of Seville (Spain), who were given a questionnaire that address a series of previously-selected attributes. For the survey, a sample of 235 university students from different degree programs and courses through convenience sampling has responded and based on the outcomes a number of valuable conclusions about the preferences of university students regarding ISP has been reached. The three most important attributes when selecting an ISP by the young people are price of internet, the possibility of obtaining a mobile phone with the contracted service and the availability of technical support to solve the problems that may arise and the findings indicates that there are also other attributes like retention contract, type of access media, data allowance, and the type of internet access that has contribution on ISP preference.

The study is highly important as it reflect points of preference on selecting internet service providers as it indicate on the possible value additions by different ISPs. The research finding indicates that price of internet service is important attribute on selecting an ISP and this seem somewhat contradicting with the previous study result that explains as price is not a determinant on the demand of internet service. But cannot be taken as contradicting because the survey collection is from different income groups and for enterprises other value additions get attention than the price on internet but for students that have dependency on their parents, it is expected to take price as a point of preference. However, it can be determined that for students and other low income groups price of internet is a determining factor on the demand for internet and it is clear that in the market with multiple internet service providers, there will be competition with one another in price that results in bill reduction and other value additions like technical support

availability, type of access media and package allowances to be preferred ISP amongst its competitors.

Cyril Eze, Khong Sin, Hishamuddin and Siang (2008) conducted a research on the topic ISPs' service quality and customer satisfaction in the southern region of Malaysia and for the assessment the researcher adopted convenience sampling method and collected primary data using survey questioner, distributing a total of 550 survey questionnaires, 436 copies returned. The collected data illustrate that the implementation and usage of enabling systems for social and business use is growing in the states and Malaysian households are becoming increasingly aware of the value of home Internet deployment. The outcomes also indicate that ISPs in Malaysia needs to invest more efforts and resources to improve the quality of services they offer to the public and a good quality services would encourage more customers to spend more time online and recommend others to deploy and use the services so ISPs should improve their service reliability and improve their overall service offerings.

It is obvious that a business environment that raises competition and allows market forces to determine the directions of demand and supply, creates a tough situation for businesses to strive and grow, and subsequently enable consumers to enjoy the best prices and benefits and that in turn enables a country to develop a solid and healthy economy based on the needs and requirements of the public. Hence, seeing on the overall contribution of ISPs development for the societal and economic growth of the country, it is suggested that government agencies and ISPs' should work closely to ensure strong competition among ISPs to enhance service quality and customer satisfaction.

Thus, certainly competition is a key for service improvement and value additions on the service provisioning and that changes and specialties created by the development of intervention are results achieved related to the interference and the purpose of this study is to examine on these impacts achieved following the involvement of private VISPs from the trend that was formerly experienced by ethio telecom.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter encompasses Research Design, Research Approach, Target Population, Sampling Technique and Sample size, Data type and Source, Data Collection Instrument, Data analyzing Techniques, Data Validity and Reliability and Ethical Considerations in the data collection and interpretation process.

3.1 Research Design

The research design to be employed for the study is descriptive since the objective of the study is to assess on the impact of private vISPs on internet service provisioning and the overall challenges and areas of improvement needs. Another reason for using descriptive design is that it helps to provide an accurate data on the penetration capacity of vISPs, level of participation on the service provisioning by the private sector, on the revenue amount generated by the partners, effectiveness of the partners on the service provisioning, the challenge areas and improvements needed. The study finding by Gall, Gall, & Borg (2007), also firming up the idea explained that the goal of descriptive research is to describe a phenomenon and its characteristics and it is more concerned with what rather than how or why something has happened mainly using observations and survey tools.

3.2ResearchApproach

As per the explanation given by Denzin (1989), qualitative research approach interprets the meanings of the activities by the participants and provides the detailed description on participants' feelings, opinions, and experiences. Moreover, in accordance with the aim of this research Bachman (1998) explained that qualitative research outcomes, as they provide the association of information processing with performance specifically and intensely. On the other hand, the quantitative method as the term quantity itself reflects numerical data and analyze mathematically. In alignment with this, Bryman (2001) described quantitative research approach as it emphasis on numbers and figures in the collection and analysis of data.

To analyze the data collected through site observations, interviews and questioners from different aspect, a mixed-method approach will be used. In accordance with the explanation by Creswell

(2007), a mixed-methods approach permits for triangulation by bring together both qualitative and quantitative research methods. Qualitative methods to be used to get in-depth information in service delivery mechanism of vISPs; address how and why parts of the study and define the classifications of data whereas quantitative method will be used to show on the numerical data analyses like customer base and access site trend, bandwidth and revenue generation tendency and service delivery time. Thus, from the aforementioned explanations given about mixed-method approach, to meet the defined purpose of the study, this approach is found to be best suited.

3.3 Target Population

To understand on the impact of private virtual Internet Service Providers on the field of Internet service provisioning, ethio telecom management members and staffs that are working on contract and service access arrangement; vISPs that are taking fixed broadband internet service in whole sale and retailing to end users and end users that are using fixed broadband internet service procured from vISPs are the target populations for the study.

3.4 Sampling Technique and Sample size

To explore the information on the penetration trend of vISPs, on the revenue amount collected by ethio telecom from the vISPs, effectiveness of the partners on the service provisioning, the challenge areas and improvements needed, the most suitable and preferred sampling method is stratified sampling for the questionnaire as most of the vISPs have similar structural arrangements comprising sales team, marketing team, customer support team, network team and information system team. Thus, from each segment a random of two individuals has sampled. For the interview questions purposive sampling technique is used and here concerned management members that have close follow up on daily activities are selected from ethio telecom and vISPs and from end users side enterprise and residential users that have long experience with vISPs are selected as the purpose is mainly checking on the existing practices and challenges by vISPs related to their internet service provisioning and thereby to cross-check with the situations in ethio telecom to examine on the changes achieved with the intervention of vISPs and this can be best managed by selecting possible reliable data sources from concerned stakeholders.

Thus, since the target population for the study is ethio telecom 10 sales staff and 4 management members, vISPs' side, CEO and other management members and staffs working in office under

sales, marketing, customer support, networking and information system categories which are nearly expected to be 10 to 15 in number and end users of fixed broadband internet connection from vISPs from residential and enterprise customers from each vISP as a verification mechanism on the service provisioning, the sampling frame that may be representative to the population of the study is described here below.

From ethio telecom side in Alternative sales channel department under sales division there is a separate section called Value Added Services Section that have end to end follow up on the service provisioning and for the data collection all section staffs that are 10 in number are included to participate on the questionnaires and the remaining management members: 2 supervisors, section manager and department head to take part on the interview questions and that will be a total of 14. Here these mentioned staffs and management members are operational teams attached to the vISP service provisioning and serve as a bridge and interface between ethio telecom and the vISPs and they can be taken as full target population and they are the right source of the required data.

On the vISPs side, as per the information gathered from ethio telecom and vISPs, the partners have organizational structure lead by Chief Executive Officer and having five main departments under its supervision namely: Sales, Customer service, Information system, Marketing and Network departments and two employees has taken from each department and the CEOs for interview questions and totally from the three vISPs a sum of 33 respondents has taken. In this case again with the average number of employees that the vISPs have and working in office, nearly the full target population has taken and most of their remaining staffs are field workers and sizes of the organizations are not as such big and scattered in nature, this is the preferred source to understand the actual existing situation representing the total vISP side population.

Besides, as the aim of the study is examining the changes brought to the field of fixed broad band internet service provisioning related to the intervention of vISPs, sample of a residential and enterprise users has taken from each vISP organizing specific interview questions and that will be a total of 6 end users taken as a data verification mechanism. Furthermore, to check on the data validity and infrastructural changes deployed, site observations have taken place to selected sites.

Thus the total sampled size for the questionnaire with stratified sampling 40 and for the interview questions purposively selected sample size of the thesis is 13 and the details of this is reflected in the table here below.

Table 2 Target population for the survey for the questionnaire

	ethio telecom	**vISPs**	
Level & category	Staffs	Management	staff
Individuals	10	1	1
Sub total	10	2	
Total	10	2*5(categories)	
Grand Total by category	10	10*3	
Total sample size for the questionnaire		40	

Source: Author, 2021GC

Table 3 Target population for the survey for the interview questions

	ethio telecom			**vISPs**	**End users**	
Level & category	Director	Manager	Supervisors	CEO	Residential	Enterprise
Individuals	1	1	2	1	1	1
Sub total	4			1	2	
Total	4			1*3	2*3	
Grand Total by category	**4**			**3**	**6**	
Total sample size selected for the interview questions					**13**	

Source: Author, 2021GC

3.5 Data type and Source

With regard to the type of data to collect, Creswell (2012) explained that from the four basic categories of qualitative data namely observations, interviews, documents, and audiovisual materials, researchers may collect using one or more of the given categories that are convenient to gather information that will answer their research questions following specific procedures of good practices, and then evaluate the merits and demerits of each form of data. On the other hand, for the quantitative part surveys may be conducted online, by phone or in person and observations that involve counting on the number of times for a particular phenomenon to occurs; and secondary data found in written form in ethio telecom, with vISPs' and end users side.

Thus, for the primary data collection interviews will be used to get the necessary information directly from the source and that may be via face-to-face meeting, email or telephone communication with the respondents. Besides, this part will be supported with site observation to strengthen the validity of the information.

For the primary data part data has collected from ethio telecom staffs and management members, vISPs management members and staffs and end users of fixed broad band internet users from vISPs and that is collected via interview and questionnaire and the survey targeted on ethio telecom side the director of Alternative Sales Channel, Value Added Services Manager, Advanced Value Added Services and Value Added Services Sales Supervisor and on the vISP partner side Chief Executive officers and other management members and staffs and on the end users side enterprise and residential users from each of the three vISPs. All concerned stakeholders in the service provisioning namely ethio telecom, vISPs and end users from different levels of management and category are included for the survey to ensure the accuracy and triangulation of the information.

For the secondary data part documents that are not prepared for this research purpose but they are found in written form and that can provide information and used as a reference document fully to get the intended data to meet the objectives of the study. This possibly will meet the expectation suggested by Creswell (2012) that indicates in qualitative research, the researcher will select people or sites that can best help to understand the principal phenomenon and that is emerged via detailed understanding of the people or site. Thus, secondary data will be collected from ethio telecom and the vISPs to understand the business rules, work processes and service level agreements of vISPs with their end users.

3.6 Data Collection Instrument

There are different approaches to qualitative interview and according to Darmer (1995), the semi-structured interview is neither a free conversation nor a highly structured questionnaire and it allows the interviewee to add his/her opinion on the questions and there are open ended questions in it that the interviewees explain his/her idea on some issues. Besides, it provides the opportunity to regulate the order of the questions and it is more flexible than structured methods. Thus, semi-structured interviews have been chosen as a method in this thesis as it is essentially to encourage the interviewees to freely discuss their own opinion on the impacts of private vISPs on the field of internet service provisioning.

The interview is conducted through three procedures: one-to-one interview- an interview where only the interviewer and the interviewee is present and in this study it will be applied for the 4 ethio telecom management members and the 3 vISPs' CEOs', self-administered interview question - a question that has been designed specifically to be completed by a respondent without

intervention of the researchers and it is applied for the 3 vISPs' top managements and a telephone interview is a pre-scheduled interview handled via a call that to residential and enterprise end users that are 6 in number. In the process of this study's data collection, telephone interview will be mainly used to interview the end users of broadband internet connection from vISPs.

For the secondary data supportive documents have identified and collected mainly on business rules that ethio telecom uses as a guide, work processes with defined responsibility matrix and service level agreements that may be expected possibly to be set between vISPs and end users. However, since the service doesn't have long age and such assessments are not previously done, well organized documentations availability may be low. Hence, such missing parts can be fulfilled by collecting the documentations a head of the interview and incorporating the missing points in to the interview questions reach on the real practices.

Question preparation: Here the researcher has formulated relevant questions to address the derived research questions on the impact assessment of vISPs', existing challenges and expected improvement areas.

Data Collection: At this step required data related to the research have gathered through interviews and document investigation and assessments.

Note Taking: During interviews and document evaluation notes has taken so that data collected during data collection can be analyzed without missing the core and relevant information from those interviewees.

3.7 Data analyzing Techniques

It is a method of applying the right logical technique to change the raw collected data to a meaningful idea that makes sense. In this regard the researcher has adopted Creswell qualitative data analysis steps to analyze and reach at conclusions. Consistent with Creswell (2009), the first step in data analysis is understanding the behavior of the data to formulate questions related to the research and that helps to address the research questions. Following the data collection, categorizing the data and refining for analysis, applying inductive data analysis and writing the report are the remaining three steps.

Categorizing the data: Data related to each category like penetration capacity, participation of

the private sector, effectiveness on service delivery, revenue generation, challenge areas and improvements needed have categorized to analyze from the perspectives of the study objectives.

Data Presentation: Here visual displays such as diagrams are used to analyze the formulation of the impact assessment and categorization has used to understand the existing practice and implementation challenges.

3.8 Data Validity and Reliability

As per the suggestion by Creswell (2012), to check on the accuracy of the research, qualitative investigations often work on validation procedures like: member checking, triangulation, and auditing. The intent of validation is to have participants, external reviewers, or the data sources themselves provide evidence on the accuracy of the information in the qualitative report. In member checking even if till recent times the researcher was part of the management team in ethio telecom, one or more staffs working in Value Added Service(VAS)section which is a section that is working on the service provisioning with end to end follow up, has checked on the accuracy of the data per the request by the researcher. Triangulation as a process by which supporting evidence from different individuals that may be person outside of the selected target group to conduct a thorough review of the study and report on the strengths and weaknesses. Besides, end users of the service and site observations are also the main means for data validity to come up with accurate data as an input for the data analysis and interpretations.

3.9 Ethical Consideration

Regarding the steps of ethical practices, Creswell (2005) states that each step is very important. Thus, in this research undertaking, all research steps have followed ethical practices and used as e center of attention in all phases: during data collection, reporting and distribution of reports. Hence, in this study the privacy of all respondents have respected in the reporting and all participants and data collection will remain confidential and identities of respondents will remain secret.

The researcher has informed participants and asks for their voluntary agreement to take part via consent management that explains aspects of the investigation before the study begins. Each participant has provided an information sheet at the beginning of the research questions explaining the purpose of the research before proceeding to the questions.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents results for the data collected from questionnaires, interviews and official papers and provides a detailed assessment on the impact of private virtual Internet Service Providers in the field of internet service provisioning in Addis Ababa, which is the main part of this study. The chapter starts with analysis of secondary data from ethio telecom documentations on business model, work processes, joint contract agreements and report documents and on the vISPs' side documents like contract agreement forms and service level agreements followed by the discussion of questionnaire data gathered from 36respondents out of the 40 selected samples with stratified sampling technique and discussion of interview data gathered from 12 respondents out of the purposively selected 13 respondents comprising of Director, manager and supervisors from ethio telecom side and CEOs of vISP and enterprise and residential end users, on the overall changes attained related to the intervention of private virtual internet service providers in the field of fixed broadband internet service provisioning.

4.2 Characteristics of Respondents

From the total sample size of 40 for the questionnaires, two of the questionnaires were not returned and one of the ten staffs on ethio telecom side was on annual leave and one questionnaire found incomplete and removed and this makes the response rate 90% with 36 valid responses.

For the interview part from the total sample size of 13 respondents, one of the interviewees on the vISPs' side were out of office with some personal issues and this makes the response rate 92% with 12 interview respondents.

Table 4: Questionnaire Respondents Demographic Profile

		Frequency	Percentage
Gender	Male	23	64%
	Female	13	36%
Age	Under 25 years	7	19%
	25- 35 years	18	50%
	36-45 years	11	31%
	46 years and above	0	0%
Educational Level	Diploma	5	14%
	Degree	23	64%
	Masters and above	8	22%
Position	CEO	0	0%
	Department head	0	0%
	Section manager	13	36%
	Supervisor	0	0%
	Staff	23	64%
Years of experience	< 5 years	21	58%
	6 -10 years	6	17%
	11-15 years	4	11%
	>15 years	5	14%
Total Respondents	36		

Source: Survey, 2021GC

The above questionnaire respondents demographic profile reflects that 69% of the respondents are young and under age of 35 years, academically 86% of them are degree and above which might contribute on the collected data accuracy and with regard to years of experience majority of the vISPs' employees considered and reflected their experience only in the field of virtual Internet Service Provisioning that they have practiced locally otherwise majority of the respondents are well experienced and indicates that both ethio telecom to support and vISPs to take the necessary lessons and bring improvements and achieve expectations in the service provisioning.

Table 5: Interview Respondents Demographic Profile

		Frequency	Percentage
Gender	Male	10	83%
	Female	2	17%
Age	Under 25 years	1	8%
	25- 35 years	5	42%
	36-45 years	5	42%
	46 years and above	1	8%
Educational Level	Diploma	1	8%
	Degree	3	25%
	Masters and above	8	67%
Position	CEO	3	25%
	Department head	1	8%
	Section manager	2	17%
	Supervisor	2	17%
	Staff	4	33%
Years of experience	< 5 years	3	25%
	6 -10 years	2	17%
	11-15 years	5	42%
	>15 years	2	17%
Total Respondents	12		

Source: Survey, 2021GC

Interview respondents demographic profile which is comprising top and medium management members also reflects that 50% of the respondents are young and under 35 years of age and academically 92% of the respondents are degree and above and that might contribute on the validity of the data collected and except the 4 respondents from end users, all the remaining respondents are mainly top and intermediate management members that gives feedback with full responsibility and can coordinate the team on the expectations. Likewise, with regard to years of experience 59% of the respondents have above 10 years' experience in the field and that is a great potential to meet and even exceed expectations in the field.

4.3 Data Organization and Presentation

Collected data in a raw format may be difficult to understand and need to be summarized, processed, and analyzed in textual, tabular, and graphical forms, so that logical and statistical conclusions can be derived from the collected data.

4.3.1 Participation of the private sector

As per the validated commercial circular reference number ET/MCD/P&S/71/2017 date on June 30, 2017, ethio telecom has opened virtual internet service provisioning for the private sector and the first vISP has joined the service provisioning and procured the initial wholesale bandwidth as of April 20, 2018 which means 10 months after the validation. The below table shows the tendency of vISP partnership engagement and how many vISPs are delivering fixed broadband internet service currently.

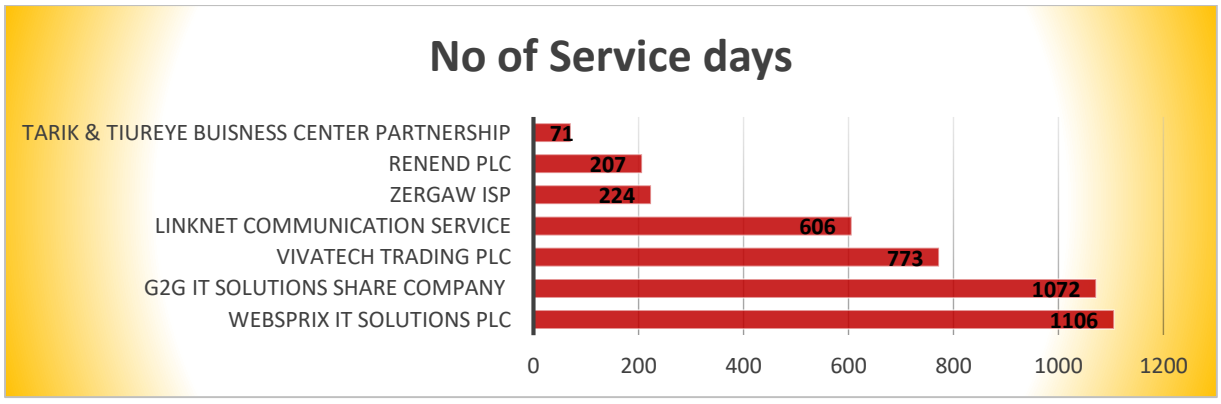
Table 6: Subscription date for active vISPs

vISP Partner's Name	Subscription Date
WebSprix IT Solutions PLC	20-Apr-18
G2G IT solutions share company	24-May-18
VIVATECH Trading PLC	19-Mar-19
Linknet Communication Service	2-Sep-19
ZERGAW ISP	18-Sep-20
Renend Plc	5-Oct-20
Tarik & Tiruye Business Center Partnership	18-Feb-21

Source: ethio telecom monthly report doc. April, 2021

The above table shows that there are currently 7 vISP partners that are providing fixed broadband internet service and the trend shows that within three years' time period seven engaged vISPs means on average in every five months one vISP is joining the partnership.

Figure 4: Number of Service days for vISPs



Source: Author, 2021GC

The above diagram clearly reflects that only the selected three vISPs for the assessment have service time of more than two years and they are top three leading partners that has experienced well the possible changes achieved by the intervention in the field of fixed broadband internet service provisioning.

Related to the business modality and its level of attractiveness private companies to take part on the service provisioning, 73% of the respondents will not agree on the attractiveness of the business model and following this even if 93% of the respondents agree that there is high market demand for fixed broadband internet service, all the respondents agree that sufficient number of vISPs didn't joined the partnership and for this 93% of the respondents believes that it is mainly due to unfair charging and delay on service delivery and maintenance support amongst this 60% of the respondent believe that it is directly the result of high running cost.

Regarding the challenges potential financiers to invest on the vISP partnership, interviewees reflected lack of trust on business continuity, lack of technical skill to run the business, high startup capital, high operational costs, limitations of support on service provisioning & maintenance, awareness gaps in ethio telecom technical team to support and trust of end users, limitations on infrastructural coverage in remote areas and low rewarding nature of the business model compared to other businesses are the main challenges hindering private investors to engage in the field and reasons for the contracts terminations experienced so far.

On the other hand, interviewees proposed as a way out focusing on the service; working on infrastructural expansions, revising LMT costs to reduce vISP operational costs; awareness creation to ethio telecom team to act in collaborative way; shortening service delivery and maintenance time and implementing Service Level Agreement; incentive package implementation based on monthly customer base grow, procured bandwidth amount and number of active sites and their remoteness and sharing important data inputs like infrastructural info on high demand potential areas not reached are important areas of focus to enable private investors engage.

4.3.2 Changes achieved in service provisioning & after sales supports

Here to see on the changes achieved in the field of internet service provisioning with the intervention of vISPs, we have to look first if there are arrangements on ethio telecom side specific to vISPs to enable them deliver better quality service and make a difference.

Ethio telecom vISP particular practices

From documentation review, the researcher identified that ethio telecom support vISPs with specialty in two main aspects: resource wise and on infrastructural arrangement.

With regard to the resource used for vISP service delivery, per the initial business circular document number ET/MCD/P&S/71/2017 indicates that ethio telecom is delivering the service from its main core switch which has standby power supply and 24/7 monitoring and follow up with the intention that not to be impacted with the failure of ethio telecom distribution boxes and possible power interruptions. This is with the purpose of assuring service continuity to enable vISPs build trust on end users and make a change in the field of internet service provisioning. Related to the infrastructural arrangements, as per the revised business circular document number MCD/P&S/101/18, ethio telecom again supporting vISPs via leaving the cost of long distance fiber installation costs by considering distances from the nearest network element or any device to encourage their participation and all the links are being delivered via fiber media related to its high bandwidth need and with the intention of avoiding possible bandwidth drops and this gives the opportunity for vISPs to make a difference through delivering better quality service at low price.

Ethio telecom Service Delivery and Maintenance process to vISPs

With respect to service delivery process, as per ethio telecom service delivery process document number CRM-ODH 50, vISPs first will have demand assessment on the area and submit request letter to ethio telecom Advanced VAS sales team and the sales team generate site survey order to the nearby technical team to check on the alternative options for the service delivery, next to the site survey arrangement the sales team receiving the survey result and cost estimation, produces commercial offer comprising subscription fee and other necessary installation costs (if any). Following the commercial offer, vISPs arrange the payments and the sales team collecting the payments create installation order for the site activation and all these activities are expected to go with priority in case of vISPs and that help vISPs to deliver the service to their end users shortly. On the maintenance support ethio telecom again supporting vISPs via dedicated standby team with priority considering the multiple end users behind each site to avoid long service outage and related compensation cost by vISPs.

Concerning ethio telecom's service provisioning and maintenance time for vISPs, 57% of the respondents agree that the existing service delivery and maintenance times taken by ethio telecom is not fair and taking long time with no difference in comparison with current ethio telecom's fixed broad band internet service provisioning time for end users. Regarding the changes achieved related to the intervention of vISPs 79% of the respondents believes that the intervention has brought significant change in the field of fixed broad band internet service provisioning and 71% of the respondents have confidence that the changes achieved with regard to customer management and service quality by vISPs are to the extent that makes them preferable in the upcoming competitive environment. However, 57% of the respondents reflects that the vISPs doesn't have service level agreement with their end users to support them with defined timeline and be penalized if they miss to deliver with the promised time schedule.

With regard to the question on ethio telecom's service delivery & maintenance time frame, all interviewees agreed as it is not serving with tolerable time frame and taking more than a month during service delivery for the reasons like awareness gap on technical team about the service; shortage on the necessary material requirements; negligence by management team; no dedicated technical team to support vISPs; lack of integration with other concerned stakeholders like water supply, electric power & roads authority and particularly in recent years following the massive tariff reduction and COVID-19 break out the delay on service delivery & maintenance get worse.

Concerning the special values added by vISPs in the FBBI service provisioning and maintenance support, all the respondents agree that comparatively there are changes achieved as a consequence of the intervention like increased accessibility, created an option for end users, out sourcing complementary parts to enable vISPs focus on the main parts, prompt service provisioning and maintenance support, better monitoring of service quality, reduced internet tariff up to 30%,enhanced pre & post sales service, customized offer & customer service, adoption of international experiences and introduction of new technologies and standards are the main areas of change achieved following the intervention.

End users interviewed verified that they know about internet service via different medias and on their connection with people but not moved to nearby ethio telecom offices for the request of FBBI service as they think the process is complex but the vISPs approached them in their resident and commercial area and upon their application service has been delivered to them on average within

a day and the respondents reflected that the prices that they are paying to the vISPs are lesser and fair in comparison with the prices that they have checked at ethio business centers and compared with other friends' payments that have procured same bandwidth from ethio telecom.

4.3.3 Existing Nature of Competition

Corresponding to ethio telecom's vISP business circular document number ET/MCD/P&S/71/2017, if any of vISPs assumed market demand and requested access in an area or compound, regardless of the number of vISPs that has got access in the area prior to the new vISP, it allows to give access for the new coming vISPs. With this approach there are areas and compounds in Addis Ababa that have up to four vISPs having access to deliver fixed broadband internet service for end users. Besides, it is apparent that ethio telecom has better coverage and nearby access for end users in Addis Ababa area than anywhere else, but still all vISPs have focused and working in this high coverage area. Thus, these conditions undoubtedly bring about competition among service providers to have market dominance.

With regard to the condition of the competition in the field of fixed broadband internet service provisioning, 40% of the respondents are not happy with the current competitive situation available and about the role of ethio telecom in the FBBI market even if there are some that has reflected as it has competitive role, the majority 53% of the respondents agree that ethio telecom has more of supporting role for the vISPs. But regarding the impact of dependency of vISPs on ethio telecom, 87% of the respondents agree that vISPs dependency may impact their service delivery and on internet tariff set up, all the vISPs agreed that with no limit and intervention they can sell internet service with the price of their preference. About the engagement and participation of multiple vISPs in an area, 80% of the respondents liked that as it creates sense of competition and enable end users to get sufficient alternative service provider options and select the better and on their approach and promotional strategies 60% of the respondents will not agree with the idea vISPs promotion is more of on pricing than other value additions.

Regarding the experience of interviewees on vISP competition practices, they have reflected that there is competition but it is at an infant stage because since the market space is very large the required competitive environment couldn't be established easily at this early stages but with the expanding nature of vISPs, better competitive environment that maximizes customer satisfaction can be formed and that contributes on increasing fixed broadband internet penetration of the

country. But it is also reflected that with the existing situation there are some challenges like vISPs focus on a few selected sites and compete with ethio telecom on high infrastructure coverage areas than remote unreached parts. Hence, to overcome the challenges and grow up vISPs, interviewees reflected as it needs monitoring the progression with clear rules and regulations; communicating ethio telecom infrastructure coverage data and expansion plan information to enable vISPs focus in areas with high market demand than areas with access and implement customer base focused incentive packages adjusting the business model.

4.3.4 Customer Base Trend of vISPs

As per the business circular number ET/MCD/P&S/71/2017, increasing fixed broadband internet service penetration is one of the primary initiatives of the vISP business modality and according to ethio telecom's strategic plan, ethio telecom is providing part of its annual target for customer base expansion to vISP partners but ethio telecom side annual reports reflects that vISPs are on average meeting below 10% of the total target given.

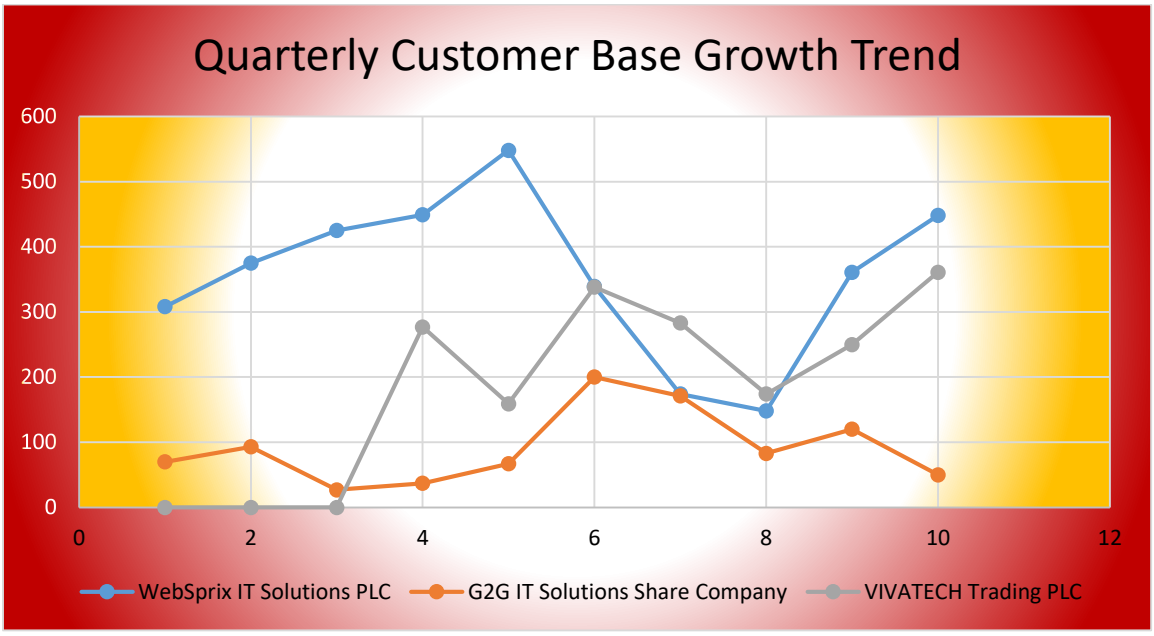
Table 7: Customer Base information for the selected vISPs

Active partners	Connected Sites	Number of end users	Total Coverage
WebSprix IT Solutions PLC	38	4101	23000
G2G IT Solutions Share Co.	33	1010	6664
VIVATECH Trading PLC	12	2952	-
Three vISPs Total	**83**	**8063**	**29664**
Grand Total	**89**	**8141**	**29664**
Three vISPs Percentage share	**93%**	**99%**	**100%**

Source: ethio telecom monthly report doc. April, 2021

In accordance with the data from ethio telecom vISPs' account managers, so far Websprix (38), G2G (33) and VIVATECH (12) active subscribed sites and except the three connected sites by G2G at Bahir dar, Senkele and Dire dawa, all the remaining sites are found in Addis Ababa. The three selected vISPs have high dominancy in the vISP service provisioning and owns 93% of the total connected sites; 99% of the total customer base and 100% of created accesses for end users in advance and this proves the impact assessment done on the three selected vISPs, reflects almost the impact of the intervention as a whole.

Figure 5: Customer base growth trend of selected vISPs



Source: Author, 2021GC

The above diagram reflecting ten full quarters (i.e 30 months) customer base trend shows that the tendency is not healthy and all in whole doesn't have consistency and doesn't allow to identify points of low performance and investigate the reasons and per the justification given from ethio telecom side account managers working on vISPs, it is related to reporting gaps. The chart reflects that Websprix and Vivatech has better customer base performance and relatively G2G marketing strategy seems different and has low growth trend with regard to customer base.

In relation to the customer base contribution of vISPs, 52% of the respondents believes that vISPs have significant contribution on the customer base expansion of ethio telecom while 40% of the respondents rely on the idea vISPs do not have substantial contribution to the annual fixed broadband internet penetration, even if they have clear monthly and annual customer base target given from ethio telecom as reflected by 64% of the respondents. With regard to customer base grow of vISPs associated with the increasing number of access sites 88% of the respondents agreed as the vISPs' penetration has growing trend with the increasing number of active access sites and this is the result of vISPs focus is increasing penetration and reaching many users than delivering huge bandwidths to limited potential customer as reflected by 60% of the respondents. Related to the concern of decreasing service quality with the expanding nature of the business, 40% of the

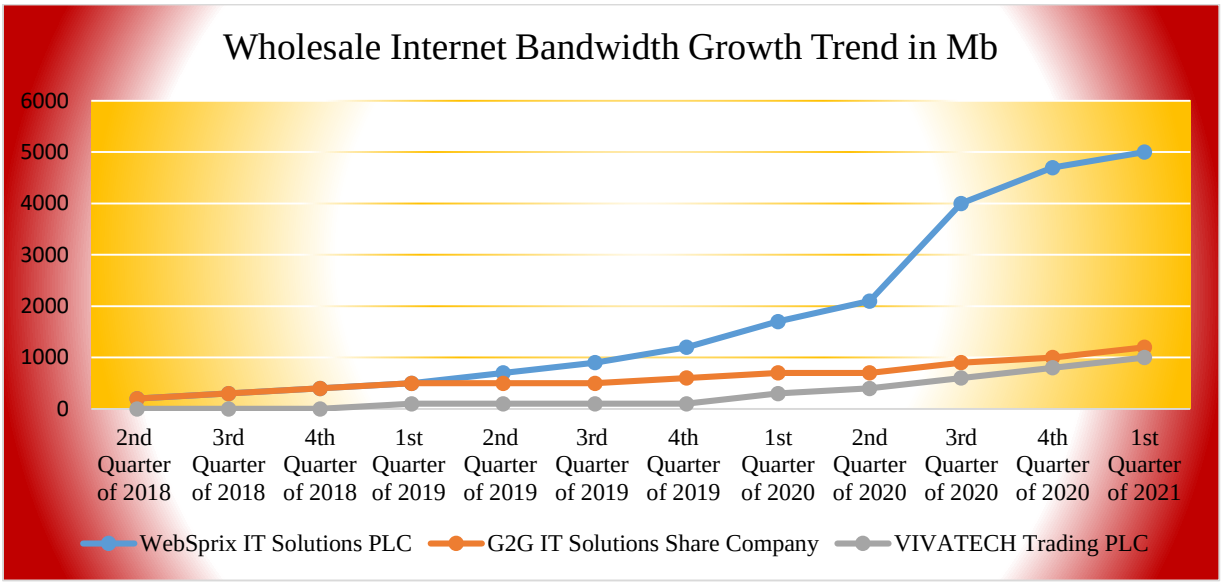
respondents will not agree and believe as vISPs can manage it well while on the contrary 36% of the respondents share this concern.

With regard to customer base expansion of vISPs, interviewees reflected that upon site selection vISPs focus on the market demand and some may prefer residential areas to reach many users with small bandwidth and others may focus on commercial areas to reach business enterprises with an intermediate bandwidth and exceptionally sometimes vISPs may focus directly on a single potential customer to deliver high bandwidth. However, it is explained that on customer base expansion move of vISPs, lack of awareness and hesitation by the society and high operational costs are the main challenge areas. To overcome these challenges, respondent proposed ethio telecom better to support on creating awareness to the society and ethio telecom technical team and awarding partners with good progress with regard to number of customers, access sites activated and bandwidth amount procured and giving as a target remote areas to deliver the service.

4.3.5 Revenue contribution of vISPs

Related to the intervention ethio telecom also needs to commercialize its idle resources and collect rental revenue from vISPs. Hence, the intervention has double benefits for ethio telecom first it will commercialize its idle capacity and collect money from it and next related to its social responsibility can reach many via the vISP platform. The monthly recurrent revenues are direct reflections of the wholesale bandwidth amount procured by vISPs and the bandwidth growth trend of the selected three vISPs is indicated in the beneath diagram.

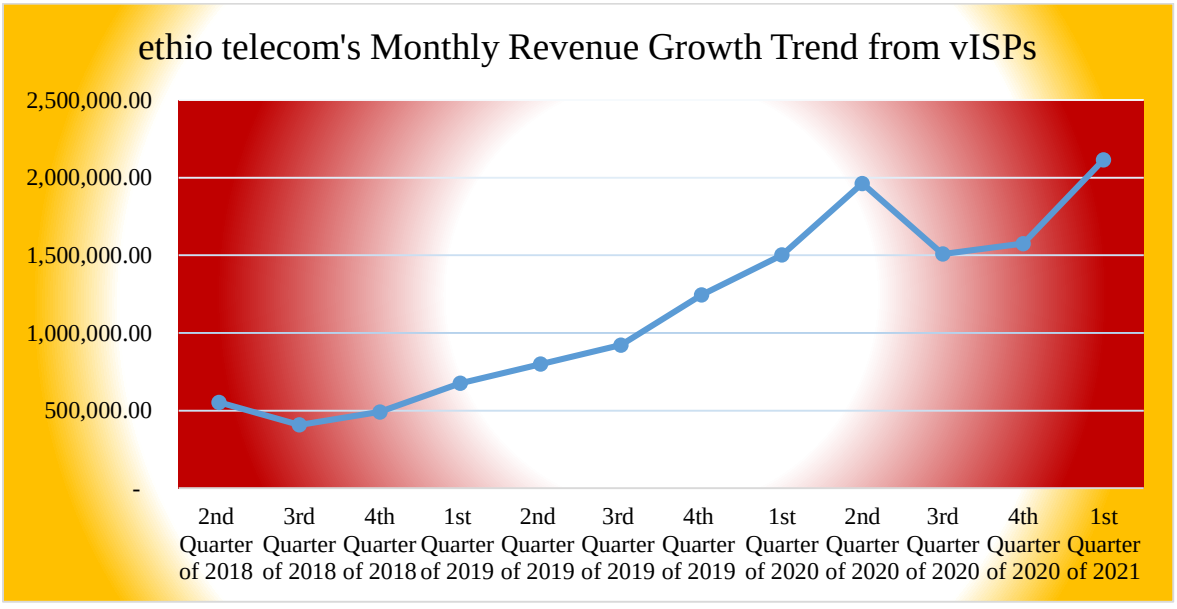
Figure 6: Wholesale Internet Bandwidth growth trend of vISPs



Source: Author, 2021GC

The above diagram reflects that initially all the three partners have slow growth on the bandwidth amount procured from ethio telecom but after the 4th quarter of 2019 Websprix IT Solutions PLC has intense increase.

Figure 7: Revenue growth trend from vISPs



The monthly revenue trend is the reflection of the amount of wholesale bandwidth procured by vISPs except that after the 2nd quarter of 2020, even if there is an increment in the purchased bandwidth amount, the revenue graph has decreasing tendency related to the massive tariff deduction done by ethio telecom.

Regarding vISP related cost on the approach followed by ethio telecom, 57% of the respondents agree that ethio telecom is supporting the field to increase penetration without any profit margin covering costs only. Furthermore, with the idea about ethio telecom's demand and cost/benefit analysis based approach of infrastructural expansion and supporting vISPs in high infrastructural cost no go decision areas if the vISPs find the area, 33% of the respondents agreed with the idea yes ethio telecom will provide while equal proportion of respondents stay indifferent. But, 52% of the interviewees reflected that if the vISPs found it profitable, no prohibiting rule and the vISP can deliver all the access bandwidth delivered with high infrastructural cost to sell it to a single potential user. With regard to the amount of revenue that ethio telecom is collecting from vISPs, 52% of the respondents agree that ethio telecom is collecting sufficient and satisfactory amount of revenue from vISPs.

Pertaining to the challenges related to the payment process interviewees reflected the manual service delivery and payment collection process as a main challenge. For the initial payments manual receipts are being issues to the vISPs and for the monthly bill follow up also there is no monitoring system and account managers are expected to send payment request to vISPs every month and if it is missed for some reasons may ends with bill accumulations and vISPs also may face difficulty on settling large accumulations at once. Thus, as a solution interviewees, proposed ethio telecom to align the service with its current working system and automate end to end.

4.3.6 Challenge areas & needs of vISPs

In any business model or project there may be challenge areas that hindering meeting of targets and needs to be addressed and there may be also identified gaps and needs by the concerned stakeholders. Hence, here below I will present challenge areas and needs of vISPs that I have identified through investigation.

vISP Challenge Areas

The challenge areas collected from interviewees listed here underneath:

- Potential financiers to invest in the vISP partnership lacks trust on the business continuity;
- vISP investment needs technical skill and experience to the how and what parts and run the business but that is what majority of the investors lack;
- It needs high startup capital and operational costs to run the business;
- Delay on service provisioning & maintenance support;
- Awareness gaps on the business model with ethio telecom technical team to understand the business case and support with priority
- Society lacking confidence on the private service providers on their legality and guessing that they are more business oriented than the social responsibility
- Limitations on infrastructural coverage specially in remote areas,
- vISPs focus in Addis Ababa areas that has better access and coverage than the regional parts
- Low rewarding nature of the business model compared to other businesses
- Lack of input resources material & skilled man power
- Negligence by management team
- No dedicated technical team to support vISP customers;
- Lack of integration with other concerned stakeholders like water supply, electric power & roads authority
- Numerous requests in the hands of technical team following the massive tariff reduction, COVID-19 break out and online access privilege arranged for fixed broadband requests;
- vISPs focus on a few selected sites with high infrastructure coverage and access than remote unreached parts;
- No clear guide and governance for monitoring
- VISPs doesn’t have info on ethio telecom’s infrastructure and expansion planto enable vISPs focus in areas with high market demand but not addressed by ethio telecom;
- No incentive package to encourage vISPs with better performance
- Manual service provisioning process will not count dates on the handler and give alarms

- Manual payment collection process may cause payment accumulation in case that account managers are on other urgent arrangements;

Desires of vISPs to perform better

Better to satisfy vISPs' and help on meeting ethio telecom initiatives on the business model, the underneath needs of vISPs identified expected to be considered:

- Short delivery of service and soonest maintenance support
- Single point of contact for support and dedicated technical team for vISPs
- Proactive service monitoring to fixed problems before it impacts users
- Service delivery process and payment automation
- Unique identity code for access sites for site management and maintenance support
- Allowing for vISPs' using deposited money for operation activities.
- Clear guide and monitoring policy to avoid confusions
- Access for ease and flexible site bandwidth management
- Infrastructural expansion to create nearby access for vISPs
- Incentive package to encourage partners on the required parameters
- LMT cost reduction and clearly defining from where to calculate
- Sharing important inputs like infrastructural info and high demand potential areas
- Creating awareness to the society and ethio telecom technical team to create sense of collaboration.

4.4 Discussion of Results and Interpretation

The objective of the study was to assess the impact of private vISPSs in the field of fixed broadband internet service provisioning, identify the challenges and desires of vISPs to perform better and recommend necessary improvement areas. The study has conducted gathering both primary and secondary data, fully get the intended data to meet the objectives of the study and to provide possible recommendations. Accordingly, this part tries to discuss the findings of the study by triangulating the information gathered from different approaches:

4.4.1 Changes achieved in service provisioning & after sales supports

As per the investigation result ethio telecom has the intention to bring specialty in the field of fixed broadband internet service provisioning with the intervention of the private sector and to meet this purpose planned to connect vISP uninterrupted internet service from its main core switch covering part of the infrastructural costs. Besides, ethio telecom's approach on managing vISP survey/service orders and maintenance requests in case of failure with priority considering hundreds of end users behind each access site is another key support to help vISPs to make a difference using their small focus area advantage.

However, from the survey results it seems that ethio telecom kept some of the promises like delivering uninterrupted service and low cost even if the vISPs still have some complaints of service failure and arguments on fiber installation distance measurement points. Nevertheless, on the point short delivery and prompt maintenance support ethio telecom could not keep its promise and taking long time.

Hence, in alignment with the promises kept and failed as it is clearly reflected by the respondents, the vISPs has made a change on FBBI service tariff providing up to 30% discount on the monthly charges compared to ethio telecom and uninterrupted internet service using the core switch advantage. However, the respondents also confirmed that vISPs has short service delivery and maintenance time, which is failed to keep by ethio telecom for vISPs specially the service delivery part. But this can be understood that vISPs couldn't keep the short delivery for the initial requests that leads the site arrangement but once the vISPs have got site activation all the service delivery will be under their management and can keep whatever promised time that has given for end users. On this regard, as per my site observation after the site activation, vISPs even go through door-to-door installation in real estate residential areas while the homes are under construction and that enables them to activate the service later even in half an hour.

Hence, even if there are some unmet promises like short service delivery, vISPs have made a difference in the areas like: prompt service provisioning and maintenance support, reduced internet tariff, adoption of new technologies, increasing accessibility and customized offers and customer service, to the extent that majority of the respondents have confidence as they can be preferred internet service provider in the upcoming competition. End users interviewed also confirmed this.

4.4.2 Existing Nature of Competition

In principle, competition to exist a single buyer needs to have more than one supplier. To decide on the presence of competition in the vISPs' market, looking on the business model or governance will be guiding. Hence, as the investigation results indicates per the vISP business guide any of vISPs can request access any time regardless of the number of vISPs previously started internet service delivery in the area and based on this there are compounds shared by up to 4 service providers and that means customers in the area have four options to subscribe for fixed broadband internet service.

A little bit confusing issue may be the role of ethio telecom in the market and the respondents believes as ethio telecom has partially competitive role but more of supporting role. However, the majority (87%) of the respondents agreed as the dependency of vISPs on ethio telecom will impact vISPs. For instance, if residents in an area requested ethio telecom for infrastructural arrangement and ethio telecom arranged the necessary investigations and market demand analysis and decided to go in the area and promised the residents and planned for the start of necessary infrastructural arrangements after 3 months arranging the necessary resources but in the meantime if the vISPs understood the market potential and requested access the possible ultimate decision will be confusing. If ethio telecom has to create access for the vISPs with priority within a month, why not do that by itself and it may have issues related to company image if the infrastructure is arranged for the vISP and the promised service delivered by the vISP with its own brand. This seems somewhat ambiguous and needs clear guide.

Related to the existing nature of competition, interviewees reflected as the competition is at an infant stage because the market space is very large and have scattered nature and the required competitive environment could not be established easily. But even if the market place is wide, findings indicates that vISPs focus on a few selected sites to the extent that 4 service providers are competing in a single compound, the wide nature is not hindering the competition. It is also apparent that ethio telecom has better coverage and nearby access for end users in Addis Ababa area than anywhere else, but still all the vISPs are working in this high coverage area. Thus, wherever access is requested in Addis Ababa by vISPs, the condition will be mainly competitive.

Hence, the findings indicate that there is competition in the field of fixed broad band internet service provisioning and regarding its nature ethio telecom needs the competition to be more on

other value additions than pricing and the survey results indicate the same. However, this seems a little bit tough as our society seems more of price elastic and mainly focus more on the tangible calculated part than other promising value additions and to make the competition focus on other value addition and assure improvement of the field, prices may be better to be fixed at some level.

4.4.3 Customer Base Trend

One of the primary initiatives for vISP business model is increasing fixed broadband internet service penetration and vISPs to distribute internet for end users needs to have access site and accordingly data findings reveals that Websprix has 4101 end users from 38 access sites; G2G has 1010 end users from 33 access sites and VIVATECH has 2952 end users from 12 access sites. It seems there are some contradictions, 88% of the respondents agreed on the idea with the increasing number of access sites vISPs will have increasing customer base, but while VIVATECH has 2952 end users only from 12 access sites, G2G has about three times less number of end users from 33 access sites. But the issue is mainly related the strategic approach followed by vISPs, G2G may be focusing high bandwidth sales for highly potential end users and one access site may be requested to deliver the service for a single end user and has 31 end users on average per access site. But on the contrary VIVATECH has on average 246 end users per access site which very high.

Respondents also reflected that vISPs have clear communication on monthly and annual customer base targets and focus on reaching many than delivering the given bandwidth to a single potential customer but here again there is no clear guide and upon site selection while some of the vISPs focus on the market demand and prefer residential areas to reach many with small bandwidth and others may prefer commercial areas to deliver to some business enterprises with an intermediate bandwidth and exceptionally there may be others that may focus directly on a single potential customer to deliver high bandwidth which is contradicting with increasing penetration and meeting customer base targets.

However, even the three leading vISPs that are contributing 99% of the total customer base don't have follow up on the given target and from the total customer base achieved in the last three years the monthly average will be 226 fixed broadband internet users per month which is less than 10% of the total monthly target given to them and if the target is given on reasonable basis, 10% performance couldn't be taken as satisfactory. Hence, even if customer penetration is one of the

main objectives of the business model, vISPs don't have equivalent attention for the task and some have totally different marketing strategy focusing on their income only and needs close follow up and supporting vISPs on their challenges followed by incentive packages upon their target achievement to encourage.

4.4.4 Revenue contribution of vISPs

With the participation of vISPs, ethio telecom will get the opportunity to sell its idle capacity and collect revenue from it and as a part of its social responsibility increase its penetration to the society. As the recurrent revenues are collected based on the bandwidth amount procured by the vISP, when the vISPs expand their access site and number of end users, expected to upgrade their internet bandwidth to deliver the required internet speed.

With regard to the recurrent monthly revenue collected from vISP, ethio telecom has provided 7200Mb whole sale access speed of fixed broadband internet and it is monthly collecting amounting birr 2,114,760.48 renting its idle capacity of internet and on this 52% of the respondents believe that the revenue amount collected from vISPs is sufficient and satisfactory. But as a start it may be taken as sufficient. However, if vISPs were given access shortly, operational costs were minimized and vISPs were get supported soon in case of failure, more penetration, more active sites, huge bandwidth and more revenue can be guaranteed.

4.4.5 Challenges areas & needs of vISPs

It is apparent that such international experience adoptions couldn't be straightened at once and needs frequent assessment and adjustment as things vary from country to country. Accordingly, the findings indicate that the business model has been revised twice incorporating the missing points. Thus, the study had critical review on the challenge areas and some of the main challenges are discussed here below:

Amongst the primary issues impacting vISPs on their decision to engage is lack of trust on the business continuity. In the contract with specialty no minimum no defined enforcement time for ethio telecom and the vISPs concerns on this regard is, related to management changes what if things are changed related to the business modality after all our investment and procurement and import of the necessary devices.

Related to bulk order found in the hands of ethio telecom technical team and some awareness gaps, ethio telecom is not delivering the service as per the promise given to vISPs and once the vISPs have worked on the demand assessment and communicated residents in the area, end users highly check on their promises to build or lost trust on the vISPs. Hence, if ethio telecom didn't start access delivery activities, residents in the area may lose trust and decide not to proceed with the vISP. On the maintenance side again if connectivity failure is occurred and problem is identified on ethio telecom side, soonest support is not being delivered and that may cause also contract termination of vISPs' end users.

As per the data findings vISPs focus in Addis Ababa areas while the market being too wide and in remote areas infrastructural coverage limitations are partially raised but as ethio telecom has multiple options for delivery, vISPs better to go on the necessary market demand analysis and come up with their request for access arrangement. Currently on the side of ethio telecom management members confirmed that no request of vISPs is closed with we couldn't create access in the area response and it is better if the vISPs can present their requests of access for ethio telecom give the chance to check on the possible delivery options.

Hence, as stated above the business model has previously revised twice to fill the operational gaps and incorporate missing points identified with the practical implementation of the service delivery, and again challenge areas and needs of vISPs to be taken as an input to make the appropriate adjustments and put clear guide for the smooth functionality of the business.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary of the Findings

In the previous chapter, the discussions have been carried out accordingly to the objective of the study. In order to assess the impact of private vISPs in the field of FBBI service provisioning in Addis Ababa, the researcher identified five main aspects namely service delivery and after sales maintenance support, nature of competition amongst vISPs, number of fixed broad band internet service users from vISPs, revenue amount collected by ethio telecom from vISPs and challenges hindering vISPs on service provisioning and needs of vISPs to meet the expected out comes.

In the vISP service provisioning from the launch of the open engagement in three years of time only 7 vISP has engaged which means on average one vISP is joining the partnership in five months of time and respondents remarked that it is not sufficient and reasons that are impeding the attractiveness of the business model are discussed.

The changes achieved with regard to service delivery and after sales maintenance support are also discussed and in this part the basic precondition arrangements done on ethio telecom side on resource and infrastructural arrangement and service delivery and maintenance support to enable vISPs make a difference in the field of fixed broadband internet service provisioning are explained and the main changes achieved related to the intervention of vISPs like short delivery and maintenance time, discounted internet tariff, better service monitoring and quality and adoption of international experiences are also discussed.

With regard to the nature of competition created in the field of FBBI service provision related to the intervention, the values added by vISP in the service provisioning and after sales maintenance issues, dominating parts of the competition and ethio telecom's role as a competitor and/or support are also discussed.Related to fixed broadband internet service users that has purchased internet from vISPs, reflected that 8063end users have been delivered till end of April, 2021 and evaluated that with this the three vISPs share 99% of the total number of users delivered by vISPs. In this part the contribution level of vISPs for the annual target of ethio telecom's fixed broad band internet penetration also discussed.

Finally, the revenue amount collected from vISPs by ethio telecom evaluating the bandwidth amount procured by each of the vISPs is presented and the overall challenges that are hindering the vISPs to meet the given objectives and the needs of vISPs to get more inspired and achieve and even exceed the expected outcomes are also described.

5.2. Conclusion

In conducting this research, the researcher has perceived the challenges of assessing the impact of vISPs in the field of fixed broadband internet service provisioning since the field vISP has two to three years of life and there is no study conducted in Ethiopia prior to this. As discussed on the empirical literature, related literatures on internet opportunities and connectivity conditions, service quality of broadband internet and determinants of demand for internet access in Addis Ababa and all suggesting the need for establishment of competitive environment on the service provisioning to assure quality network, good service provisioning and after sales support. Besides, studies conducted in Spain on preferences of university students on the choice of internet service provider and ISPs' service quality and level of customer satisfaction in the southern region of Malaysia are reviewed to take experience of possible improvement areas by ISPs to create sense of competition to attract more internet users and the purpose of this thesis was to assess on the impact of private vISP in the field of internet service provisioning in Addis Ababa.

For the assessment four parameters namely: changes brought in the field of fixed broadband internet service provisioning and after sales support issues, nature of competition amongst vISPs to attract more end users, the total number fixed broad band internet service users from vISPs, revenue amount collected by ethio telecom from vISPs and challenge areas and vISPs' needs forbetter performance are selected.

Based on the assessment it found that to enable vISP make a change in the field of fixed broadband internet service provisioning and after sales maintenance support issues, providing uninterrupted internet service from its core switch, deducting infrastructural installation by measuring distances from the nearest telecom devices and giving priority upon service provisioning and maintenance and vISPs can make a change in the field using the opportunities given by ethio telecom. The main

changes achieved in the field of FBBI service provisioning and after sales support issues are: short delivery time for the service, service delivery at discounted tariff, better monitoring of service quality, enhanced pre & post sales service, customized offer & customer service, adoption of international experiences and introduction of new technologies.

The study findings indicate that there is competition between vISP on their service provisioning and the above value additions are also the result of this competition. With regard to the nature of competition available between vISPs on their access sites, it is reflected that it can be with all the value additions mentioned above. The survey results show that partially vISPs consider ethio telecom as a competitor as it has also some values to be preferred by end users even at greater usage tariff and respondents also explained that vISPs being dependent on ethio telecom for their access arrangement, if ethio telecom is considered as a competitor that may make difficult keeping the healthiness of the competition.

The survey results also revealed that from the three vISPs alone 8063 end users have connected in the periods till end of April, 2021 and which is 99% of the total end users connected by vISPs. But it is reflected even if vISPs have given annual and monthly targets for customer base expansion, they are performing less than 10% of the given target only. With regard to vISPs revenue contribution, ethio telecom currently collecting monthly recurrent revenue amounting birr 2,114,760.48, selling 7200Mb bandwidth whole sale access speed from its available idle capacity and even if there was the opportunity to maximize the stated amount most of the respondents reflected as it is sufficient amount as a start.

The study also investigated on the overall challenge areas related to the intervention and the following are the major once. Partners lacks trust on the business continuity; lack of skilled and experienced technical person; it needs high startup capital and operational running costs; delay on service provisioning & maintenance support; awareness gaps on the business model with ethio telecom technical team and society; society lacking confidence on the private service providers; limitations on infrastructural coverage specially in remote areas; vISPs focus in Addis Ababa areas that has better access and coverage than the regional parts; low rewarding nature of the business model compared to other businesses; lack of material resource and skilled man power; lack of focus by management team; no dedicated technical team to support vISP customers; workload on

ethio telecom technical team; vISPs focus on a few selected sites; no clear guide and governance for monitoring; no incentive package to encourage vISPs and the manual process of service provisioning and payment management.

On the other hand, as per the survey result, vISPs needs the following requirements to be considered and fulfilled on ethio telecom side to perform better. These are: Short delivery of service and soonest maintenance support; Single point of contact and dedicated technical team for support; proactive service monitoring; Service delivery process and payment automation; Unique identity code for access sites for site management and maintenance support; allowing for vISPs' to use the deposited money; clear guide and monitoring policy to avoid confusions; access for ease and flexible site bandwidth management; Infrastructural expansion to create nearby access for vISPs; Incentive package implementation; LMT cost reduction; sharing important info on infrastructural coverage and creating awareness to the society and ethio telecom technical team.

5.3. Recommendation

The high market potential available for fixed broadband internet service that couldn't be shifted much even with the expansion of mobile broadband part related to its advantage unlimited package with limited minimum price, a total of 7 vISP partners one partner in every 5 months is not enough. Hence, ethio telecom better to work on the hindering factors and attract more investors to the field and even to arrange the business model on credit basis.

With regard to the service delivery and after sales maintenance support, study results reflect that there is dalliance and not tolerable level and on the other side again vISPs have concern related to ethio telecom's participation in the market as a support and competitor and to address this critical parts better vISPs to have Service Level Agreement (SLA) with ethio telecom to have dedicated team for end to end support and even to penalize ethio telecom in case of dalliance.

Customer base per site rate of the three vISPs reflects a big gap from 31/site to 246/site and in one way it can be taken as a strategic approach difference the first focusing on big enterprises that are purchasing high bandwidth while the other focusing on residential areas to deliver small bandwidth to many. But on the other way there may be some illegal or prohibited approaches practiced by vISPs and it needs technical site audit on the network topology of vISPs.

To avoid the payment and reporting gaps, ethio telecom better to systemize the service provisioning in alignment with its existing working system and integrate the reporting to be extracted from the system at real time basis and partners are not expected to send on weekly or monthly basis.

To improve all the process and create better working environment, both ethio telecom and vISPs take their concerned actions related to the areas of challenge and desires of vISPs. Following that the business model needs continuous improvement to result in the smooth right model convenient for all as the business model is new for our country and implementations and guides may vary depending on the area and nature of service providers, frequent revision and update of the business requirements and rules to put clear regulations avoiding the gaps.

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Appendix 1

3.4. Monthly Rent for Secondary lines

In areas where Ethio telecom deployed secondary lines, vISPs shall use already deployed Ethio telecom infrastructure with monthly rent.

The monthly line rent is calculated using the following formulas.

Monthly Line Rent for Copper = (0.12* Total Length of Rented Copper Line in Meter) + 40

Monthly Line Rent for Fiber = (2.10* Total Length of Rented Fiber Line in Meter) + 40

Table 1:-sample rent calcualtion for the copper and fiber cable

Rented Line in Meter	Number of pairs	Monthly Rent for Copper in Br	Monthly Rent for Fiber in Br
1	Any	40.12	42.10
10	Any	41.18	60.96
50	Any	45.92	144.78
100	Any	51.83	249.56
200	Any	63.67	459.11
300	Any	75.50	668.67
400	Any	87.33	878.22
500	Any	99.17	1,087.78
600	Any	111.00	1,297.33
700	Any	122.83	1,506.89
800	Any	134.67	1,716.44
~~700~~	~~Any~~	~~122.83~~	~~1,506.89~~ Duplicate
~~800~~	~~Any~~	~~134.67~~	~~1,716.44~~ Duplicate
900	Any	146.50	1,926.00
1000	Any	158.33	2,135.56

Note:-

- All prices are exclusive of VAT.

Internet Users Statistics for Africa

(Africa Internet Usage, 2021 Population Stats and Facebook Subscribers)

AFRICA 2021 POPULATION AND INTERNET USERS STATISTICS						
AFRICA	Population (2021 Est.)	Internet Users 31-Dec-2000	Internet Users 31-DEC-20	Penetration (% Population)	Internet Growth % 2000 - 2021	Facebook subscribers 31-DEC-2020
Algeria	44,616,624	50,000	**25,428,159**	57.0 %	50,756 %	25,140,000
Angola	33,933,610	30,000	**8,980,670**	26.5 %	29,835 %	2,831,000
Benin	12,451,040	15,000	**3,801,758**	30.5 %	25,245 %	1,538,500
Botswana	2,397,241	15,000	**1,139,000**	47.5 %	7,493 %	1,139,000
Burkina Faso	21,497,096	10,000	**4,594,265**	21.4 %	45,842 %	1,998,200
Burundi	12,255,433	3,000	**1,606,122**	13.1 %	53,437 %	667,700
Cabo Verde	561,898	8,000	**352,120**	62.7 %	4,302 %	287,000
Cameroon	27,224,265	20,000	**7,878,422**	28.9 %	39,292 %	4,267,000
Central African Rep.	4,919,981	1,500	**557,085**	11.3 %	37,039 %	135,700
Chad	16,914,985	1,000	**2,237,932**	13.2 %	223,693 %	443,200
Comoros	888,451	1,500	**193,700**	21.8%	12,813 %	193,700
Congo	5,657,013	500	**833,200**	14.7 %	166,540 %	833,200
Congo, Dem. Rep.	92,377,993	500	**16,355,917**	17.7 %	3,271,083 %	3,800,000
Cote d'Ivoire	27,053,629	40,000	**12,253,653**	45.3 %	30,534 %	5,860,000
Djibouti	1,002,187	1,400	**548,832**	54.8 %	39,102 %	258,100
Egypt	104,258,327	450,000	**54,741,493**	52.5 %	12,064 %	48,830,000
Equatorial Guinea	1,449,896	500	**362,891**	25.0 %	72,478 %	120,900
Eritrea	3,601,467	5,000	**248,199**	6.9 %	4,864 %	6,200
Eswatini	1,172,362	10,000	**665,245**	56.7 %	6,552 %	339,900
Ethiopia	117,876,227	10,000	**21,147,255**	17.9 %	211,372 %	6,745,000
Gabon	2,278,825	15,000	**1,367,641**	60.0 %	9,017 %	830,000
Gambia	2,486,945	4,000	**442,050**	19.0 %	11,713 %	419,100
Ghana	31,732,129	30,000	**14,767,818**	46.5 %	49,126 %	7,944,000
Guinea	13,497,244	8,000	**2,551,672**	18.9 %	31,795 %	1,938,000
Guinea-Bissau	2,015,494	1,500	**250,000**	12.4 %	16,566 %	140,000

Kenya	54,985,698	200,000	**46,870,422**	85.2 %	23,335 %	10,444,000
Lesotho	2,159,079	4,000	**682,990**	31.6 %	16,974 %	490,900
Liberia	5,180,203	500	**760,994**	14.7 %	152,098 %	658,200
Libya	6,958,532	10,000	**5,857,000**	84.2 %	58,470 %	5,857,000
Madagascar	28,427,328	30,000	**2,864,000**	10.1 %	9,446 %	2,864,000
Malawi	19,647,684	15,000	**2,717,243**	13.8 %	18,015 %	637,600
Mali	20,855,735	18,800	**12,480,176**	59.8 %	66,284 %	2,033,300
Mauritania	4,775,119	5,000	**969,519**	20.3 %	19,290 %	927,300
Mauritius	1,273,433	87,000	**919,000**	72.2 %	956 %	919,000
Mayotte (FR)	279,515	n/a	**107,940**	38.6 %	n/a	95,500
Morocco	37,344,795	100,000	**25,589,581**	68.5 %	25,489 %	21,730,000
Mozambique	32,163,047	30,000	**6,523,613**	20.3 %	21,645 %	2,756,000
Namibia	2,587,344	30,000	**1,347,418**	52.1 %	4,391 %	792,000
Niger	25,130,817	5,000	**3,363,848**	13.4 %	67,177 %	577,800
Nigeria	211,400,708	200,000	**203,168,355**	96.1 %	101,484 %	31,860,000
Reunion (FR)	901,686	130,000	**608,000**	67.4 %	367 %	608,000
Rwanda	13,276,513	5,000	**5,981,638**	45.1 %	119,532 %	806,200
Saint Helena (UK)	6,086	n/a	**2,300**	37.8 %	n/a	2,300
Sao Tome & Principe	223,368	6,500	**63,864**	28.6 %	882 %	60,800
Senegal	17,196,301	40,000	**9,749,527**	56.7 %	24,273 %	3,802,000
Seychelles	98,908	6,000	**71,300**	72.1 %	1,088 %	71,300
Sierra Leone	8,141,343	5,000	**1,043,725**	12.8 %	20,774 %	833,400
Somalia	16,359,504	200	**2,089,900**	12.8 %	852,550 %	2,089,900
South Africa	60,041,994	2,400,000	**34,545,165**	57.5 %	1,339 %	24,600,000
South Sudan	11,381,378	n/a	**900,716**	7.9 %	n/a	436,600
Sudan	44,909,353	30,000	**13,124,100**	29.2 %	43,647 %	1,300,000
Tanzania	61,498,437	115,000	**23,142,960**	37.6 %	20,024 %	5,223,000
Togo	8,478,250	100,000	**1,011,837**	11.9 %	912 %	860,500
Tunisia	11,935,766	100,000	**8,170,000**	68.4 %	8,070 %	8,170,000
Uganda	47,123,531	40,000	**18,502,166**	39.3 %	46,155 %	3,328,000
Western Sahara	611,875	n/a	**28,000**	4.6 %	n/a	27,000
Zambia	18,920,651	20,000	**9,870,427**	52.2 %	49,252 %	2,543,000
Zimbabwe	15,092,171	50,000	**8,400,000**	55.7 %	16,700 %	1,303,000

TOTAL AFRICA	**1,373,486,514**	4,514,400	**634,863,323**	**46.2 %**	**13,963 %**	**255,412,900**
Rest of World	**6,502,279,070**	356,471,092	**4,463,600,449**	**68.6 %**	87.5 %	2,474,111,201
WORLD TOTAL	**7,875,765,584**	360,985,492	**5,098,463,772**	**64.7 %**	**100.0 %**	**2,729,524,101**

NOTES: (1) Africa Internet Statistics for Dec 31, 2020, have been updated as of Feb 14, 2021. (2) Africa Facebook subscribers are estimated for December 31, 2020. (3) CLICK on each country name for further data on individual countries and regions. (4) Africa Population numbers are mid-year 2021 estimates, based on data from the United Nations Population Division. (5) For definitions, navigation help and methodology, see thesite surfing guide. (6) Africa Internet usage information comes from, among others, data published byWWW,ITU, Facebook, and other trustworthy information sources. (7) For Internet growth comparison purposes, baseline Internet usage data for the year 2000 is also displayed. (8) Data from this table may be cited, giving the due credit to Internet World Stats and establishing a link back towww.internetworldstats.com

ST. MARY UNIVERSITY

SCHOOL OF GRADUATE STUDIES

MPM PROGRAM

Dear respondents;

The purpose of this survey is to understand the impact of private vISPs on the field of Internet service provisioning in Addis Ababa. The information collected will be used as a primary data in my study which I am conducting for the partial fulfillment of the requirements of my study at St. Mary University School of Post Graduate Studies for the degree of master of arts in Project Management.

This questionnaire is planned to acquire significant data to the research projected to come up with treasured recommendations for challenge areas (if any). Hence, your genuine, and quick response is a valuable input for the excellence and effective accomplishment of the study. Be confident that all information you provide will be kept quite confidential and it will be used only for research purpose.

Thank you in advance for your kind cooperation.

I. Personal Information

1. Gender: ☐ Male ☐ Female

2. Age: ☐ Under 25 years ☐ 25- 35 years ☐ 36-45 years ☐ 46 years and above

3. Educational Level: ☐ Certificate ☐ Diploma ☐ Degree ☐ Masters and above

4. Position: ☐ CEO ☐ Department head ☐ Section manager ☐ Supervisor ☐ Staff

5. Years of experience: ☐ < 5 years ☐ 6– 10 years ☐ 11-15 years ☐ >15 years

6. From which segment you are ☐ ethio telecom ☐ vISP partner

II. Based on your experience as a support and service provider of virtual Internet Service, please rank your perceptions on the statement to what extent do you agree with each of the points?

S.No	Research Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
A, Issues on participation the private sector						
1.	The vISP business model is attractive enough private companies to take part on the service provisioning.					
2.	In consistent with the market demand, enough number of vISPs has joined ethio telecom for the service provisioning.					
3.	There is lack of demand on fixed broadband internet service and that is why new vISPs are not being encouraged to join the partnership.					
4.	ethio telecom's one time and monthly charging from vISPs are fair & helpful to attract more vISPs to the field					
5.	The market demand is high but there are discouraging factors like high installation & rental costs and no soonest support upon service delivery & maintenance support					
B, Service provisioning issues						
1.	The service provisioning and maintenance time of vISPs' is short and fair in comparison with current ethio telecom service provisioning.					
2.	The intervention of the private sector on fixed broadband internet service provisioning has brought significant change in the field.					
3.	vISPs have a service level agreement with end users to enable end users penalize the service provider in case					

of service failure& maintenance delay.					
4. vISPs are getting access shortly from ethio telecom in case of new access requests not to lost trust and reach soon their new customers.					
5. The current level of customer management and service quality by vISPs enable them to be a preferred service provider even in the upcoming competitive environment.					
C, vISP competition issues					
1. There is fair competition amongst vISPs that helps to bring changes on the service provisioning.					
2. ethio telecom is a support but not competitor for vISPs in the field of fixed broadband internet service provisioning					
3. vISPs dependency on ethio telecom may impact vISPs on their competition with ethio telecom.					
4. vISPs can sell internet with the price of their preference without limit.					
5. Multiple engagement & participation of vISPs in a single compound is vital to create sense of competition.					
6. With the intervention of vISPs end users have got enough alternate options during service need to compare and select the better.					
7. The marketing & promotional strategies of vISPsare more of on pricing rather than other value additions.					

D, Customer Base Issues					
1. vISPs have enough customer base grow up and significant contribution to ethio telecoms annual penetration target.					
2. vISPs have clear monthly and annual customer base targets and related incentive mechanisms					
3. vISPs focus on increasing penetration rather than huge bandwidth sales & revenue collection					
4. vISPs have increasing monthly customer base expansion with the increasing number of access sites					
5. vISPs have decreasing tendency with regard to accelerated service delivery and maintenance with the expanding nature of their work					
E, Revenue collection Issues					
1. Upon vISP service provisioningethio telecom is following an approach,increase penetration covering costs only and not with some profit margin.					
2. ethio telecom has a demand and cost/benefit analysis based approach on infrastructure expansion but support vISPs even in no go areas.					
3. ethio telecom's payment system is convenient for vISPs to enable arrange payments from their collection.					
4. ethio telecom is collecting satisfactory amount of revenue from vISPs					
5. vISPs can deliver all the wholesale access speed procured to a single end user rather than retailing activities if they found it profitable.					

III. Please write on the below free space what you feel about the questions.

1. What are the challenges potential financiers to invest in the vISP partnership and what do you propose to enable more vISPs take part on the service provisioning?

_____

_____

_____

2. What special values do you think the vISPs has added in the field of service provisioning?

_____ _____

_____ _____

3. Do you think as ethio telecom is delivering the service for vISPs with tolerable time frame? If not, what do you think are the problems on ethio telecom side?

_____

_____

4. Do you recommend the vISP engagement for others? What do you propose for ethio telecom to attract more potential partners?

_____

_____

5. Have you experienced competition amongst vISPs? What do you expect on the long run outcome of the vISP intervention?

_____

_____

Thank you once again for your honest and prompt response.

ST. MARY UNIVERSITY

SCHOOL OF GRADUATE STUDIES

MPM PROGRAM

Interview questions for ethio telecom management members

Dear respondents;

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This interview question is planned to acquire significant data to the research projected to come up with treasured recommendations for challenge areas (if any). Hence, your genuine, and quick response is a valuable input for the excellence and effective accomplishment of the study. Be confident that all information you provide will be kept quite confidential and it will be used only for research purpose.

Thank you in advance for your kind cooperation.

Part1: Personal Information

1. Gender: ☐ Male ☐ Female

2. Age: ☐ Under 25 years ☐ 25- 35 years ☐ 36-45 years ☐ 46 years and above

3. Educational Level: ☐ Certificate ☐ Diploma ☐ Degree ☐ Masters and above

4. Position: ☐ CEO ☐ Department head ☐ Section manager ☐ Supervisor ☐ Staff

5. Years of experience: ☐ < 5 years ☐ 6– 10 years ☐ 11-15 years ☐ >15 years

Part II. Impact Assessment related questions

1. What are the challenges potential financiers to invest in the vISP partnership and what do you propose to enable more vISPs take part on the service provisioning?
2. Does ethio telecom experienced contract termination from vISPs? If yes, describe the reason.
3. What special values do you think the vISPs has added in the field of service provisioning?
4. Do you think as ethio telecom is delivering the service for vISPs with tolerable time frame? If not, what do you think are the problems on ethio telecom side?
5. What do you propose to enable ethio telecom deliver the service shortly upon vISPs' request?
6. Have you experienced competition amongst vISPs? What do you expect on the long run outcome of these competitions?
7. Is there any challenge in the existing competitive environment & what do you propose for its betterment?
8. What do you think are the problems that are hindering vISPs from reaching to many end users and what do you propose vISPs to overcome the challenges and have high penetration and reach more?
9. What challenges you experienced related to vISPs' payment issues and what a better payment scheme you propose to be implemented to attract more vISPs and develop the existing once?

SCHOOL OF GRADUATE STUDIES

MPM PROGRAM

Interview questions for vISPs top management

Dear respondents;

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Part1: Personal Information

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2. Age: ☐ Under 25 years ☐ 25- 35 years ☐ 36-45 years ☐ 46 years and above

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4. Position: ☐ CEO ☐ Department head ☐ Section manager ☐ Supervisor ☐ Staff

5. Years of experience: ☐ < 5 years ☐ 6– 10 years ☐ 11-15 years ☐ >15 years

Part II. Impact Assessment related questions

1. Do you recommend the vISP engagement for others? What do you propose for ethio telecom to attract more potential partners?
2. What value additions you think added in the field of internet service provisioning with your participation?
3. How much is your average service delivery and maintenance time that you have currently and what an improvement plan do you have?
4. What are the challenges that impacts your service delivery and maintenance and what do you propose ethio telecom to support your office to improve its service delivery and maintenance time?
5. What a marketing & promotional strategy your company follow and how do you see the contribution of the competition for the service improvement?
6. Have you experienced customer turn over to other vISP or ethio telecom and vice versa? If yes, what were the factors?
7. What unfair competition challenges you experienced and what do you propose for better competition and service improvement?
8. What special value additions your office has to be a preferred service provider in comparison with other vISPs?
9. No doubt that with the increasing number of end users, vISPs maximize their revenue gain. But what are the challenges that hinder the effort of reaching many?
10. What are your challenges related to ethio telecom's current payment scheme and what approaches you propose for its betterment?

SCHOOL OF GRADUATE STUDIES

MPM PROGRAM

Interview questions for Enterprise and individual end users

Dear respondents;

The purpose of this survey is to understand the impact of private vISPs on the field of Internet service provisioning in Addis Ababa. The information collected will be used as a primary data in my study which I am conducting for the partial fulfillment of the requirements of my study at St. Mary University School of Post Graduate Studies for the degree of master of arts in Project Management.

This interview question is planned to acquire significant data to the research projected to come up with treasured recommendations for challenge areas (if any). Hence, your genuine, and quick response is a valuable input for the excellence and effective accomplishment of the study. Be confident that all information you provide will be kept quite confidential and it will be used only for research purpose.

Thank you in advance for your kind cooperation.

Part1: Personal Information

1. Gender: ☐ Male ☐ Female

2. Age: ☐ Under 25 years ☐ 25- 35 years ☐ 36-45 years ☐ 46 years and above

3. Educational Level: ☐ Certificate ☐ Diploma ☐ Degree ☐ Masters and above

4. Position: ☐ CEO ☐ Department head ☐ Section manager ☐ Supervisor ☐ Staff

5. Years of experience: ☐ < 5 years ☐ 6– 10 years ☐ 11-15 years ☐ >15 years

Part II. Impact Assessment related questions

1. Do you know about fixed broad band internet service ahead of vISPs' move on sales & promotion?
2. Did you experience fixed broadband internet service with ethio telecom ahead of this? If yes, how do you compare the provisioning and after sales issues by vISPs & ethio telecom?
3. What special values you think added by the vISPs on fixed broadband internet service provisioning and do you think as the intervention is important?
4. Why you preferred your existing service provider (vISP) from ethio telecom & other vISPs?
5. Could you please explain on the instance that you meet with your internet service provider, with your much effort or with the effort of vISP's marketing and sales persons?
6. How long the vISP's take to deliver fixed broadband internet service after your application?
7. Do you think the initial and rental payments that you are paying to vISPs fair and how do you see the tariff against ethio telecom?